



FRIDAY, AUGUST 3.

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Contributions.

Running Boards and Some Other Things.

PORT JERVIS, N. Y., July 30, 1888.

TO THE EDITOR OF THE RAILROAD GAZETTE:

Your remarks on running boards, in your issue of June 22, led me to look particularly at those on some fine new grain cars which I have lately seen on the Erie. Those are made of three yellow pine boards, one inch thick and seven inches wide, lengthwise of the car, and rest on substantial oak cleats. The ends project three inches beyond the car, with an oak cleat under them, and at each end of the car are two iron braces, secured by bolts and nuts. The whole arrangement is very solid, and I wonder why it is not cheaper, safer and more durable than the arrangement shown in M. C. B. drawings in the number of your paper above referred to, in which the boards are made of short pieces, crosswise. There are less pieces to get loose, and the ends, the places most liable to derangement, and where derangement is most dangerous, are certainly much more substantial. To be sure, the long boards are liable to warp, and if the ends got loose and warped up they would be bad things for a brakeman to run against in the dark; but in these particular cars the yellow pine boards are screwed down to the oak cleats, and if they are kept painted so as to keep the wood from rotting around the screws, I do not see why they should not be as durable as any other part of the roof. With the boards put transversely there are about six times as many fastenings necessary to hold them down as when they are put lengthwise, and I do not suppose it is customary to fasten them with screws.

I noticed incidentally that these cars had 9-in. iron dead blocks, Janney couplers, Westinghouse air brakes, Dunham doors and McGuire grain doors. I do not know how many other patent contrivances they had, but I could not help thinking that a first-class modern freight car is getting to be a pretty complicated structure. At the same time I thought that about 30 of these, with a mogul engine, would make a mighty pretty train.

J. M.

The Coosa Mountain Tunnel.

BIRMINGHAM, Ala., July 27, 1888.

TO THE EDITOR OF THE RAILROAD GAZETTE:

I take pleasure in furnishing you the following details attending the construction of our Coosa Mountain tunnel, recently completed:

This tunnel is the larger of two, which were necessitated by the extension of the Columbus & Western Branch of the Georgia Central system from its former terminus, Goodwater, Ala., to Birmingham, a distance of 69 miles. The smaller of the two, through what is known as Oak Mountain, is 22¼ miles east of Birmingham, and is 1,211 ft. from portal to portal, while Coosa tunnel is 3 miles further east, and is 2,434 ft. between portals.

Both of these tunnels, in connection with something over 20 miles of ordinary grading, bridging and masonry, were let by contract to Messrs. Dunant, Tate & De Bardeleben on the 30th day of November, 1886, and work was commenced on the approaches to Coosa about the 1st of January, 1887. These latter, especially on the west side of the mountain, were exceptionally heavy, and it was not until the middle of February that entrance was made into the tunnel proper at the east portal, nor until the latter part of the month that the same was accomplished at the west portal.

Coosa tunnel, to which my remarks will be confined, is situated about midway a maximum grade line, 6 miles long, ascending westward and reaching its summit in the centre of Oak Mountain. This grade rises continuously, at the rate of 68 ft. per mile, except where it is equated for curvature, and the west portal of the tunnel is therefore about 30 ft. higher than its eastern portal. The summit of the mountain is 535 ft. above the grade line immediately underneath, and the contour of the mountain was such that it was decided best not to sink any shafts, so the entire work was done by pushing the headings from either end. A six degree curve on the east extends 120 ft. into the tunnel, but the remainder of its length is on a tangent.

The contractors provided for this work two 16 in. x 24 in. straight-line Ingersoll air compressors, supplied by three 50 horse-power steel tubular boilers; one air receiver, 24 ft. long and 5 ft. in diameter. Air pipes, 3 in. in diameter, were laid over the mountain and into each heading. This

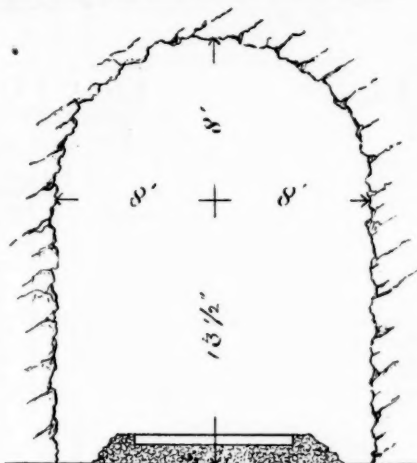


Fig. 1.

power worked six 3½ in. Ingersoll rock drills in each end of the tunnel. (Three in each heading and three on each bench.)

In driving the tunnel much trouble was caused by the large volume of water encountered. On the eastern side it was more of an inconvenience than hindrance, as it flowed rapidly out; but on the opposing side a number of powerful pumps had to be kept constantly engaged to enable the work to proceed. On one or two occasions, following heavy

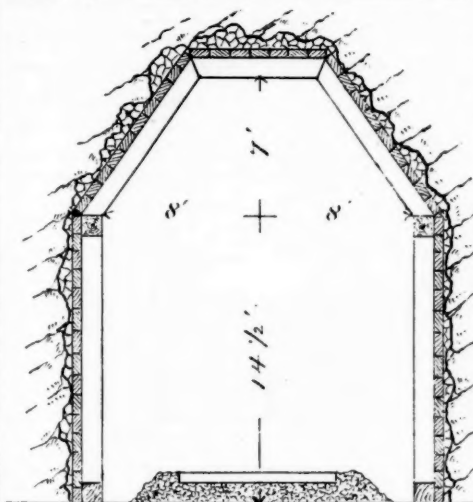


Fig. 2.

rains, the waters from which appeared to find ready access through the roof, work was temporarily suspended on the western side, the supply being too great for the capacity of the pumps.

The tunnel was finished and received on the 17th day of June last, the excavation having been prosecuted day and night for 16 months, giving an average monthly progress of but little over 150 linear feet, although as much as 250 ft.

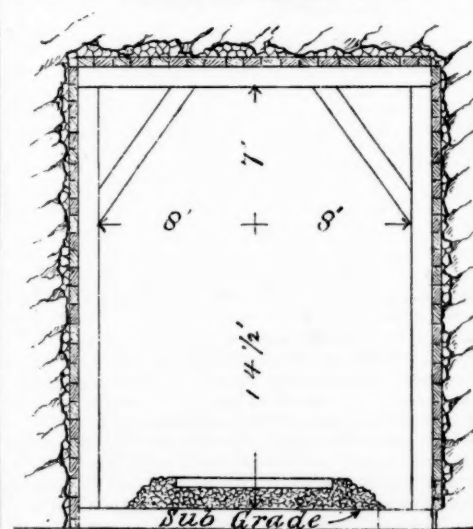


Fig. 3.

was made during one month. This variation was due in part to the increasing distance, as the headings advanced over which the debris or "muck" had to be hauled in disposing of it, but chiefly to the difference in the character of material developed at different stages of the work.

Nearly three-quarters of the whole mass excavated consisted of shale, or "slate rock," as it is called in this section,

of varying degrees of hardness, some of it being soft enough to be readily cut, while other specimens were almost as hard as sand rock and contained more or less grit. The remaining one-fourth section (or more) proved to be a very hard quality of sand rock, difficult to classify, and containing small white pebbles imbedded at intervals.

These very hard strata were encountered at six different points, but all confined to the central thousand feet of the tunnel.

Wherever the slate was encountered it was found necessary to protect it on account of its tendency to crumble and chip off on exposure to the atmosphere. The sand rock, on the other hand, was amply self-sustaining and required no timber. The prescribed cross-section for the latter was 16 ft. clear width between vertical walls, by 13½ ft. height above sub-grade, surmounted by an arch, approximating a semicircle of 8 ft. radius. (See fig. 1.) Where timbering was used the same clear dimensions were practically obtained by enlarging the previous cross-section to admit of their introduction, and altering the semicircular arch to conform in a rude measure to a semi hexagon. (See fig. 2.)

The system of timbering adopted consisted of a series of heavy frames or "bents" of 12 by 12 timbers placed generally 4 ft. apart centres, although at one point it was deemed safer to close them up to 2 ft. centres, leaving but 1 ft. clear interval. These bents were sheathed or "lagged" overhead and generally on the sides with 6 by 10 stuff, and all void spaces between this lagging and the rock surface thoroughly packed with cord wood.

Each bent is composed of two 12 by 12 posts resting on longitudinal sills of the same dimensions and surmounted by 12 by 12 wall plates. Upon the plates are shouldered batten posts, inclined as shown, and keyed by a horizontal cap of similar size.

This style of timbering was found to answer all requirements except at the east portal, where the material, for 50 or 60 ft. inwards, proved treacherous. During the spring freshets a heavy slide from the face of the mountain took place over that portal, on one side only, and the immense moving mass brought a pressure to bear on that side, at an angle of about 45 degrees, sufficient to spring the posts from their normal position, and we decided to replace them with the system shown in fig. 3. As you perceive, the posts were carried up to the top of the arch, were bound together above and below, and the upper braces being made to conform to the original batten posts, gave us the same clear interior section as before. This substitution of new timbering proved both tedious and costly, but is considered effective.

The work was superintended by Mr. R. C. Hunt, representing the contractors, and Mr. G. A. Baker, Resident Engineer, on the part of the railroad company.

When the headings met, the transit lines closed within ½ in. and the levels within .08 of a foot.

F. Y. DABNEY, Chief Engineer.

Notes on the Theory of Location.

TO THE EDITOR OF THE RAILROAD GAZETTE:

For a long time I have had it in mind to make some notes, suggested by my own experience on Wellington's "Economic Theory of Railway Location." First I will say that if one were obliged to strike a balance of merits and demerits, and only mention what was in excess, he would find little to say in the way of adverse criticism. Varying experience sometimes makes us view things in different lights.

In his introduction the author takes exception to a definition of engineering as the "art of constructing," and says, "In a certain important sense it is rather the art of not constructing." This last is emphatically true in one "important sense." The engineer may study to avoid an expensive construction. His efforts in this direction will hardly be appreciated if successful, as nothing is in sight to prove his success. The man who fails in the avoidance, and builds the structure, is the skillful engineer, and the construction is proof of it.

The writer has in view a case in point, a railroad about 40 miles long, near the middle of which is a bridge that cost one hundred and twenty thousand dollars. At the time of its completion the local newspapers made illustrious the engineer of the road, extolling his skill for having caused to be built such a monumental structure. One can hardly help admiring the tact of those operating the road, and wondering with what grim satisfaction the attention of the public is called to this phenomenal blunder, by advertising excursions to it from both directions. The last year's report shows that it cost a trifle more to operate the road than the amount of gross receipts, proving that, if as an advertising agency the bridge is a success, as a component part of 40 miles of railroad it is probably a failure. With the structure itself we are not now dealing, nor criticising the skill of the engineer designing it. As one folly is likely to be coupled with another, it is hardly necessary to mention that the road is of narrow gauge.

"No saving of expenditure is expedient or justifiable, however doubtful the future of the enterprise as a whole, when it can with certainty be counted on that the additional expenditure will, at the cost for the capital to make it, be in itself a paying investment."

Such a saving of expenditure is certainly justifiable when the means in hand are not sufficient to complete the road without this saving of expenditure. I mean that an engineer would be justified in not including in the estimated cost of proposed work an expenditure strictly in accordance with what he deems economy, knowing that the owners of capital cannot be made to see that so great an expenditure would be profitable, and therefore would not furnish it. It is a

question of half a loaf or no bread. Instances in proof of this are lines of railroad, now trunk lines, on which have been expended sums in rebuilding which, if asked for in original construction, would have caused an indefinite postponement of the projects, involving great loss to prospective communities, as well as to stockholders themselves.

The writer has himself made surveys with reference to uniting the present Rock Island and Chicago & Northwestern in Central Iowa, and building a joint line thence to the Missouri River, because parties who were stockholders in both roads did not think it would pay to build the two lines entirely across Iowa! Twenty years ago it was a matter of notoriety in Iowa that the president of the former road was housed by officers armed with injunctions to prevent the money authorized by its Board of Directors from being expended for the extension of that road to the Missouri River. The legislature, most of whose members had a constituency anxious to have an early completion of the road, did not hesitate to pass a law, with no pretense of its constitutionality, prohibiting the stockholders from electing a new directory, in accordance with their by-laws and articles of incorporation. It was certain that before the courts could decide the law constitutional, the money could be expended and the road completed.

The present managers of another trunk line opposed at court, and finally froze out, a former chief engineer because he was disposed to build what in their estimation was too good a road west of the Missouri River. As the engineer had intelligent backing enough behind him to enable him to complete the road nearly in accordance with his judgment, there is reason to believe that those now having control are extremely glad he had "the courage of his convictions," and that the less than two hundred miles then built had much to do in giving character to many hundred miles since constructed by the same company.

The writer had somewhat to do with the location of 200 miles mentioned, and finding when near the end of the first half that a maximum grade of 32 ft. per mile was a necessity, he thereafter used that freely for the balance of the distance. He remembers being sent back to revise his work and reduce the grade on the last half of the distance. The result was a maximum grade of 32 ft. per mile for 12 miles, all within 18 miles of the distance, with a grade on the balance of the line not exceeding 22 ft. per mile. The only credit claimed by the writer for himself, on account of these conditions, is that he never questioned the wisdom or propriety of the order for the revision, and that he executed it, as he believes, with good judgment, and as he knows, with alacrity.

There may be no doubt as to who should decide upon questions of true economy, and what amount of money should be supplied for the execution of a certain project; it frequently happens that some one else determines how much will be supplied. The engineer may not yield his opinion as to what will be ultimate economy, but he may yield to the inevitable in financial restriction, and adapt his ends to means in sight, unless a question of public safety may intervene, or a very probable loss of professional reputation may result. Then his resignation may be in order. He will insist upon the privilege of deciding upon characteristics, such as grades adapted to his location, and that no mere economy hunter will be allowed to adapt them entirely to cost of construction. "The cheapest line is to be built over which it is physically possible to carry the probable traffic with proper safety and speed, using to this end any grades and curves and length of line which may be most conducive to this end only." Comfort should be added to safety and speed as an item for which patrons pay, and this may limit curvature further than what is merely consistent with the other two factors.

Without calling in question the policy of using reasonably heavy rails, especially when means are ample for all judicious investments, the "using of over light rails" can hardly be deemed one of the "economies which permanently handicap the line," such use being one of the temporary expedients most readily set aside, and if an error, one most easily corrected.

"Because a line will have, or is expected to have, a prosperous future, there is, therefore, no justification in that fact alone for making it a costly road as well." And because the country over which a line is to be located presents few physical difficulties, this should be no reason for not studying strict economy in its location and construction; availing himself of natural advantages being quite as important as overcoming natural obstacles. Indeed one of the commonest failures of the engineer is in not securing the best results when the difficulties to be surmounted are the least, involving the ability to make proper comparison of small things, and correct estimates of the difference.

"If the railroad will not go to the traffic, the traffic will go to the railroad."

While it is usually disastrous for a railroad to disturb trade centres, there are instances, when before the "manufacture of transportation" is begun, it would be better for the railroad to move at its own expense an embryo town, or even a village of considerable size, rather than tax all its traffic by going to it; the town having no advantage that would not be possessed after change of location, and all danger of future strifes being avoided by placing at the start a future centre of business on the line of the natural course of traffic.

A "great continental line" was once diverted, it is safe to say improperly, by two considerable towns, neither of which had any claim for protection. After the diversion was decided upon, getting back to the natural course of traffic was made the excuse for inserting 9 miles additional distance; two blunders not offsetting each other.

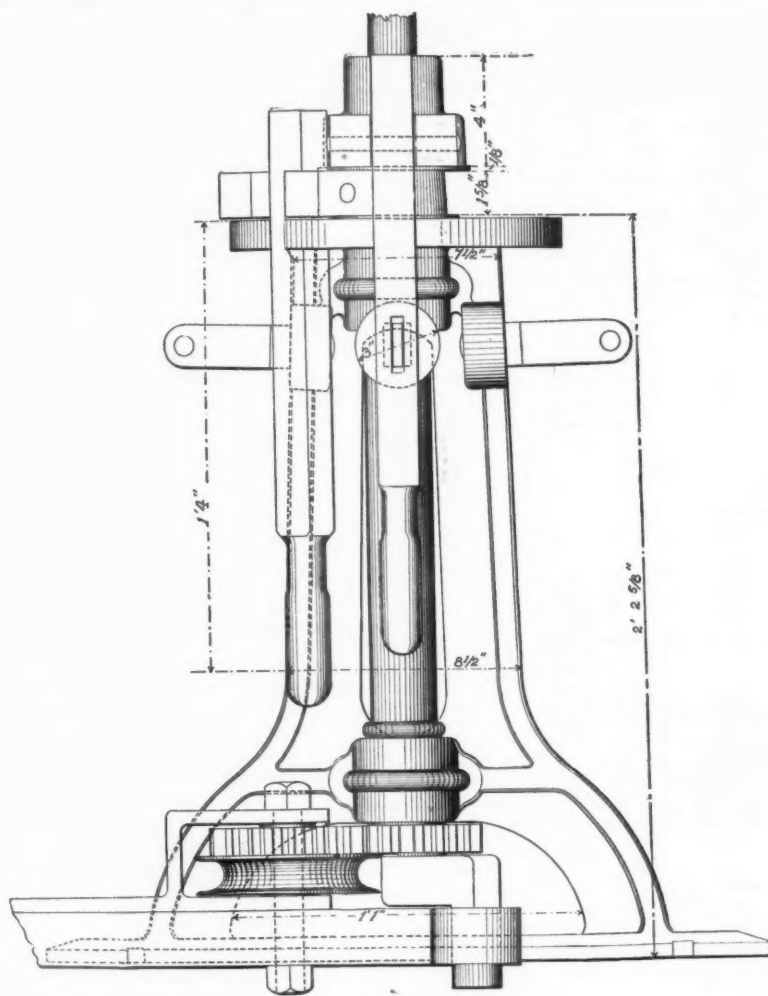


Fig. 1.

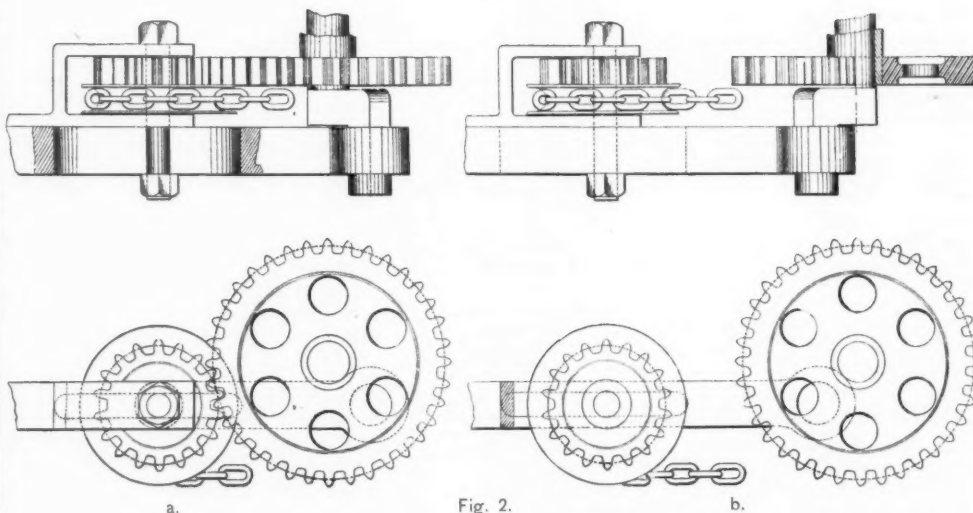


Fig. 2.

INTERLOCKING SWITCH AND SIGNAL STAND.

CHICAGO, MILWAUKEE & ST. PAUL RAILWAY.

It matters not, that one of these towns has become a prominent city, which no railroad would care to ignore. The presumption is fair, that the same energy that was shown in overcoming natural obstacles, would have been shown in the development of natural advantages, and by the same people, they having too much sagacity to fight the inevitable.

It would hardly be safe, however, to ignore the fact that, in many instances, "the people make the town." A railroad built in territory entirely unsettled and undeveloped, supposed to have everything under its own control, located all the stations expected to be required in the near future, if not in the ultimate settlement of the country, under the direction of its own town-site company.

Soon enterprising parties, claiming probably an innate talent for founding cities, located at intervening points, and demanded of the railroad facilities for transportation and for doing business. Their demands were ignored or contested, until finally it was suspected that the interests of the town site company were not wholly identical with those of the railroad stockholders, and the new town site owners carried their point. It became notorious, too, that these "in-

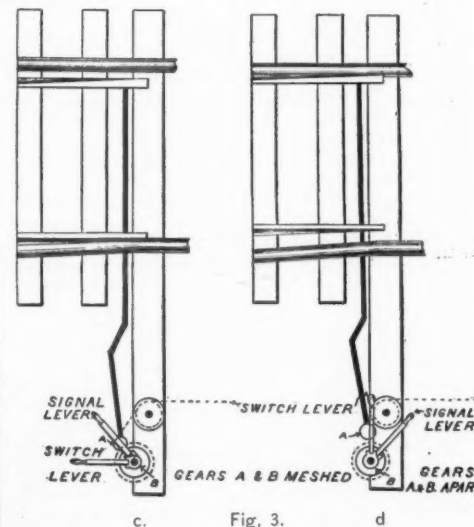


Fig. 3.

terlopers," founded by men earnest in their own interests, took the lead of places settled by others relying upon the guardianship of the railroad company, rather than upon their own resources and energy; not because they possessed any natural advantages of location, but because of the men who controlled their destinies.

A.

Signals and Switches on the Chicago, Milwaukee & St. Paul.

In the *Railroad Gazette* of June 22 was given some account of the experience of the Chicago, Milwaukee & St. Paul in working a block system on a single track line. The same company has lately given a good deal of attention to the proper protection of crossings, junctions and facing-point switches, and during this Summer it is intended to protect, by interlocking, some six grade crossings and junction points. The plan adopted by the company is to purchase from the manufacturers the interlocking machines, leading-out fixtures, facing-point locks, detector-bars and other special fittings, while the company supplies wire, cable and pipe line connections, signal-posts and attachments and does the erecting. In this way it is expected that certain advantages will be gained. The unnecessary duplication of standard patterns will be avoided, and the plant will be installed with due regard to economy in maintenance. A good deal of difficulty has been found in so placing wire and pipe lines that they shall be perfectly drained, and yet kept out of the way of snow flangers. This is one of the considerations which it is supposed the company's officers will treat more intelligently than a contractor.

No pattern of interlocking machine has been adopted as a standard, but those machines in common use which have preliminary locking will be tried, and that which is considered best will be adopted.

All connections to switches, locks and home signals will be by pipe line, and to distant signals by single wire lines without compensators. The company does not consider perfectly reliable any wire line compensator now in use, and prefers to make the necessary adjustment by hand, turn buckles being provided for the purpose.

In the accompanying illustrations is shown the standard train order and block signal post. This post is the same as the standard home or distant signal which has been adopted, except that it has, as will be seen, two semaphores, with the necessary fittings, and two lenses in the lamp. The standard post is made of round cedar, the bark removed, and spoke-shaved. Straight sticks are selected, 32 ft. long, and not less than 8 in. in diameter at the top. The centre-bearing plates are unusually heavy, and all the fittings strong and simple. The post when erected is handsome and business-like. The sticks cost in the rough \$3 each, and the total cost of the single-arm signal and post is estimated at \$25.

For the train order and block signal the lever stand is placed in the station. The operator is, therefore, relieved from the temptation to neglect to display or clear the signal which he often has when he is obliged to go outside to do it.

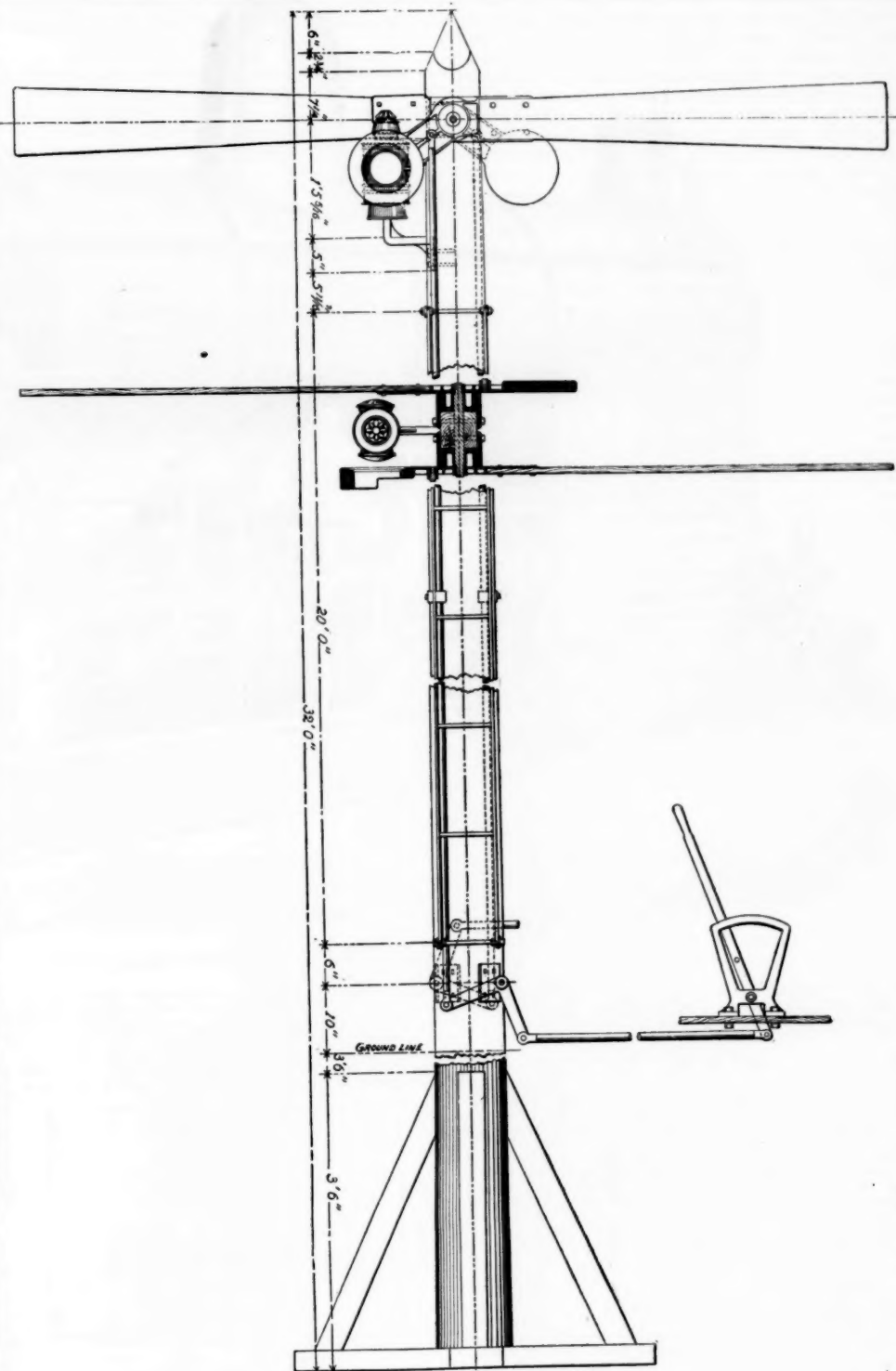
For protecting facing-point switches in obscure places, two methods are adopted, and it intended to apply one of them to every main line switch where a clear sight of at least 1,200 ft. cannot be had.

Where the nature of the obstruction will permit, a double-arm signal will be used exactly similar to the block signal post, except that the arms will work together from one crank, attached by a rigid short rod connection directly to the head rod of the switch. This is merely a high semaphore signal indicating the position of the switch points, the height being sufficient to clear the local obstructions. Of course the two arms are used only on single track switches, being applied to preserve uniformity in the instructions to run by right hand signals only.

Where the position is such that this arrangement at the switch will not clear the obstruction a "home signal at a distance" is used. This is worked by a wire connection from an interlocking switch stand, shown in the illustrations herewith. The stand is of cast iron and is identical with the standard switch stand used on the road, with the exception of the interlocking signal attachment. This attachment consists of an extra handle, keyed to a pipe sleeve which surrounds the main spindle. By the main spindle and the crank at its foot the switch is operated, and by the pipe sleeve and its attachments the signal is operated. To the lower end of the sleeve is keyed a spur gear, the function of which is to rotate a second gear and shelve operating a wire line. These gears are shown in plan and elevation in the cuts. The second gear and a chain shelve are carried in the forked end of a rod which rides on the main switch-rod and is attached to the head-rod. The spindle on which the gear revolves is carried through the throw-rod, which latter is slotted as shown. The object of this arrangement will be described further on.

When the switch is set for the main line the switch-lever stands parallel to the track and is locked by dropping into a notch in the circular table. The signal-lever stands at the position shown in fig. 3, c. To set the switch for the siding the signal-lever must first be moved out of the way, otherwise the switch-lever cannot be moved. Turning the signal-lever to the second position, shown in fig. 3, d, rotates the spur gear, slackens the wire connection, and the signal goes to danger by the counter-weight. The switch may then be thrown. The switch point, however, in moving pulls over the rod carrying the second gear and throws the gears out of mesh, as shown in figs. 2 and 3, in which position, of course, the switchman has no further control of the signal. It will be seen that the operation of the apparatus is very simple and, apparently, thoroughly effective.

The feature of the arrangement which is considered most novel and valuable is the device for automatically displaying the danger signal in case the switch is run through. This is done by means of the slotted head-rod, which allows the rod carrying the shelve gear to pull the latter out of mesh with the gear on the stand, the bolt moving in the slot. The signal wire is thus released, and the signal goes to danger. The necessary flexibility in the connection between the switch-points and the stand may be secured by a spring or



STANDARD TRAIN ORDER AND BLOCK SIGNAL POST.

CHICAGO, MILWAUKEE & ST. PAUL RAILWAY.

crooked throw-rod; the latter is used on the Chicago, Milwaukee & St. Paul.

These stands were used through the last winter on that road and have now been adopted as the standard. The interlocking attachment can be applied to the ordinary stand at a cost of about \$8. The stand is patented by Mr. George Gibbs, Mechanical Engineer C., M. & St. P.

It will be seen that the governing idea in the protection of the facing point switches is the use of a semaphore, position signal, which gives a positive signal both for danger and when the line is clear, which is obviously a very important gain over the ordinary switch target.

Explosion of Dynamite on the Schooner Parallel.

The Transactions of the Technical Society of the Pacific Coast, April-December, 1887, just received, contain a short, but very clear and interesting account by Mr. J. Le Conte, of the explosion of a cargo of dynamite on the schooner "Parallel." This explosion took place Jan. 15, 1887, and, of course, was much discussed at the time, but it was so remarkable that the principal facts will bear retelling.

The schooner "Parallel" was a sailing vessel of 142 tons register and having a capacity of about 350 tons. For ballast she carried 10 tons of pig iron and 10 tons of coal in sacks. Over this was laid 10,000 feet of hardwood lumber. Next in order came the cargo proper, which comprised 82,600 pounds of dynamite of three varieties, namely, Giant Powder—No. 1, 14,250 pounds; No. 2, 43,350 pounds; and Judson Powder, 25,000 pounds. This material was packed in wooden boxes containing 50 pounds each, and was carefully stowed away amidships. In addition she also had in her hold some 50 cases of coal oil and 20 barrels of machine oil, and 10 tons of baled hay.

On January 15th, 1887, this vessel at about 9 o'clock p. m., while clearing the port of San Francisco, became unmanage-

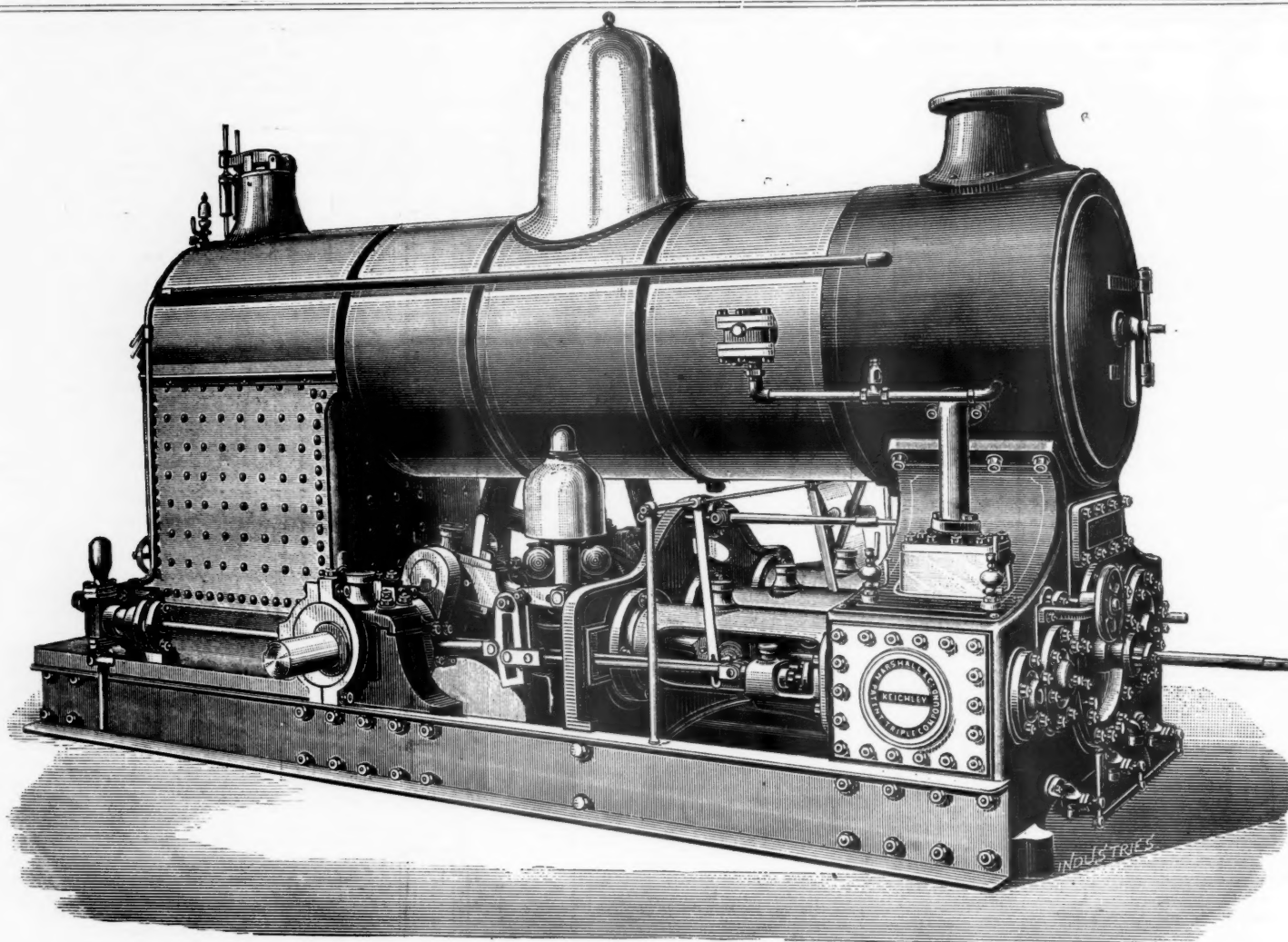
able and began to drift ashore towards the rocky point near the Cliff House. The crew naturally became alarmed and finally took to the boats and left the schooner to her fate. About 9:15 p. m. she went ashore, grounding on some outlying rocks. She soon stove in her bottom and settled down hard upon the reef, sitting nearly upright with all sails set and sidelights burning. A light was burning in the cabin when the crew deserted her. Heavy seas prevailing at the time, soon deluged her decks and filled her cabin full of water. Parties walking along the beach picked up fragments of broken dynamite boxes with trade-marks thereon. The schooner bumped upon the rocks from 9:15 p. m. to 12:34 p. m., or say 3 1/4 hours, when her cargo of dynamite exploded with terrific force, damaging all the houses within a radius of a mile and scattering the fragments of the vessel and cargo for a distance of half a mile around the site of the wreck.

The schooner was absolutely and completely annihilated; not a vestige of the vessel remained to mark the spot where she lay. Fragments of shattered timbers and wire rigging lay scattered over the adjoining country for a mile, one piece from her bows, weighing some 3,000 pounds, landed on the beach abreast of the Pavilion, distant 2,300 feet from the wreck. Nothing of her cargo was found save the pig-iron ballast, which was scattered all over the entire neighborhood, pieces weighing 50 to 100 lbs. being found at a distance of 2,500 ft. from the site of the explosion. This fact should be remembered.

At the time of the explosion the schooner was lying close up against a large outlying rock, averaging 15 ft. high, 30 ft. wide and 60 ft. long, containing say 1,000 cubic yards of solid highly metamorphic sandstone, weighing say 165 lbs. per cubic foot, or something like 2,000 tons of solid rock. This rock was completely demolished and wiped out of existence; a smooth, gravelly beach now covers the site.

A portion of the rocky cliff abreast of the schooner had a large piece gouged out to a depth of 8 ft., and extending some distance up the hill.

The two watchmen standing guard on the brow of the cliff were severely stunned by the explosion. One was



TRIPLE EXPANSION NON-CONDENSING ENGINE.

blown off his feet and up the hill a distance of 200 ft., while the other was blown to a distance something less; both men had a miraculous escape. The large outlying rock intervening between them and the blast undoubtedly saved their lives.

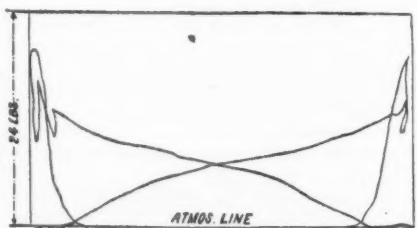
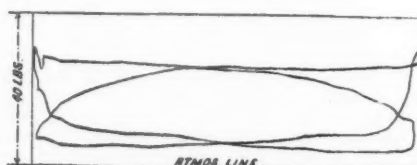
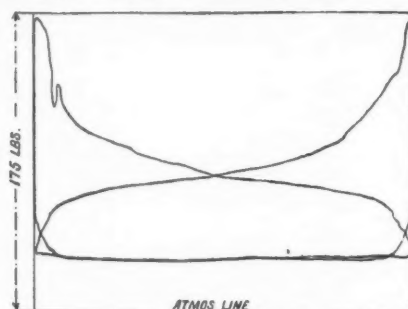
The mechanical effects on the neighboring houses were somewhat extraordinary in character, and are well worthy of record. The Cliff Cottage is a two-story frame building distant 630 ft. from the blast, and 100 ft. above. This entire building was driven bodily one foot toward the roadway. Every window and outside door was driven inwards with great violence. Nearly all the plastering on the ceilings and side walls was blown off and into the rooms, mingling with the broken window-glass all over the floors. The lighter furniture was upset by the carpets being blown up off the floors, while the heavier pieces were twisted round out of position. The most remarkable feature observed in this place, and which struck me at the time as extraordinary, was the fact that where a window on the side of the house next the blast came opposite to an inside partition wall, there we find the force of the blast so violent, that after crushing in the window it continued right across the room a distance of 12 ft. or more, and actually blew a hole clear through the partition wall and of the same size and shape as that of the window through which it entered. Of course the 2" x 3" studding was left *in situ*, but all the laths and plastering on both sides were blown out completely, making a clear and sharp outline. All around the margin of this hole, as well as against the face of the studding, was a perfect fringe of long needle-like fragments of glass driven into the plastering and woodwork with great force and penetration.

The Cliff House is a two and a half-story frame building, distant 795 ft. from the schooner, and 85 ft. above it. Here the mechanical effects of the blast were almost identically the same as those seen at the Cliff Cottage. The damage was greatest of course at the north end of the house next to the blast, where the entire sidewall of the kitchen was blown in; but all the windows and outside doors were burst inwards with great force, in some instances splintering the doors into small fragments like kindling wood.

The Sutor House is a one-story frame building with a high basement, situated 1,350 ft. from the blast and 200 ft. above. Intervening between the blast and this house is a very high picket fence (25 to 30 ft.), which is used as a wind break. The same general facts and features were found to exist here as elsewhere, but the effects were much less violent. The shock struck the house on the corner; all the doors and windows were stove inwards on the front and north side, while in the south end and rear the same facts were true but somewhat less in extent. The frescoed ceilings and side walls were all badly cracked and blown inwards; but, taken as a whole, this house was much less damaged than the Cliff House.

In looking over the field of destruction I was soon impressed with the marked distinction between the characteristic features of the damage done to houses close to the blast, as compared with those which were more remote; that is to say, all the houses damaged showed unmistakable evidence of being subjected to a sudden and violent compression of the surrounding atmosphere, so great in intensity as to burst in the windows and outside doors; but the houses nearer the blast, in addition to this general effect, common to all, experienced a powerful thrust on the side next to the explosion, notably the Cliff Cottage, distant 630 ft., which was driven bodily 1 ft. toward the roadway. At the Cliff House, distant 795 ft., the thrust effect was somewhat less marked, but still very decided. Next we have the Sutor House, distant 1,350 ft.; here the thrust effect on the side next the blast was much less pronounced—we might say relatively quite feeble, yet noticeable. Finally, then, we have the large glass

conservatory, distant 1,625 ft., where there seems to have been an entire absence of evidence as to the existence of any thrust effect on the side of the house facing the blast. Now, then, it would seem reasonable to suppose, from the above facts, that the radius of the thrust effect in this particular neighborhood was somewhere between 1,350 and 1,625 ft. in length. Beyond this limiting radius the dam-



Indicator Diagrams, Triple Expansion Engine. High, Intermediate and Low Pressure Cylinders.

age done to houses seems to be such as is due simply to a universal compression of the surrounding air, and therefore the mechanical effects were the same on all sides alike. The houses on the beach road, distant 2,300 ft., and completely sheltered behind the high hill, were nevertheless considerably damaged by the blast. This fact is quite remarkable, and seems to show that a spherical wave of compression transmitted through the air will pass an intervening obstacle and re-establish its sphericity behind the same so rapidly that the obstacle really affords little or no shelter.

Several theories as to the causes which led to the explosion have been advanced by as many different men, all of whom seem to base their opinions more or less on the pure assumption that the schooner took fire and subsequently exploded. It seems to me that there is no necessity for such an assumption as conflagration or any other outside hypothesis. The two watchmen on the cliff near the blast, as well as other witnesses, refute the idea of there being any conflagration aboard the schooner, and state that the ship's hold and cabin were full of water soon after she struck on the rocks, and, furthermore, that solid seas swept her decks with nearly every swell that came in from the bar.

Now, let us simply consider the existing facts of the case. In the first place, the schooner had 10 tons of pig iron in the bottom of her hold; immediately over this was the cargo of dynamite. It follows as a necessary consequence that when the vessel struck on the rocks her bottom was stove in, and the pig iron was forcibly driven up into and mixed with the bursted boxes of dynamite, fragments of which came ashore before the explosion, having the trade marks thereon intact.

Here, now, we have a schooner bumping and grinding to pieces on the rocks, with 10 tons of pig iron in her hold all besmeared with dynamite. It is a fact well established that iron work of any kind besmeared with nitro-glycerine will explode when roughly handled. The chief lesson, therefore, to be learned from this accident would seem to be that iron work besmeared with dynamite will also explode when roughly handled even if submerged in water.

Triple Expansion Non-condensing Engine.

The engine represented in the accompanying engravings possesses several novel features, which, in addition to the remarkable economy obtained, render it worthy of careful examination.

This "semi-portable" type is little used in this country, but the exceedingly small space occupied and the self contained character of the engine render it exceedingly convenient in situations where land is valuable. The weight of the boiler resting on the engine frames serves to steady them and render holding down bolts unnecessary. The frames being composed of rolled channel are strong vertically, and an engine of this type will work well on any temporary foundation, while the ashpit, boiler setting, etc., required for most boilers can be entirely dispensed with.

The accompanying engravings and the following description of the engine are taken from *Industries*, a paper published in Manchester, England.

In these times of keen competition it is surprising that the principle of triple expansion, which proved so efficient and economical in marine engines, should have been so entirely neglected by makers of stationary engines. Ship owners and ship builders have been fully alive to the advantages offered by these principles, and have refitted their old steamers with triple expansion engines, thereby attaining greater speed and a smaller consumption of coal than with the engines of the old type. If such satisfactory results can be obtained in marine engines, why, we may ask, should not similar results be got with triple expansion stationary engines? We are glad to see that at least one firm have taken up this important matter, and to Messrs. Mar-

shall & Co., engineers, Keighley, belong the credit of constructing the first undertype triple expansion engine, which is illustrated in the accompanying engraving. In consideration of the high steam pressure, the makers have wisely abandoned the flat slides for the high pressure cylinder, and are using piston valves of a special design. There is a main and expansion valve on the outside of the small cylinder, an ordinary slide valve on the outside of the intermediate cylinder on the other side of the engine, and an ordinary slide valve above the low pressure cylinder, which lies between the two other cylinders. By the special construction of the high pressure piston valves the two valve rods are brought close together, making the whole arrangement very compact. The piston rod of the low pressure cylinder is prolonged through the back cover for attachment to the air-pump, if the engine is to be used with a condenser. The steam is taken from the highest point of the steam dome, and the three cylinders are jacketed with live steam.

GENERAL PARTICULARS OF BOILER AND ENGINE.

Boiler:	
Length of barrel.....	6 ft. 2 in.
Diameter of barrel.....	2 ft. 6 3/4 in.
External width of fire-box.....	2 ft. 7 3/4 in.
External length of fire-box.....	3 ft. 6 in.
Height of fire-box from grate.....	2 ft. 10 in.
Area of grate before trial.....	6.3 sq. ft.
Area of grate at trial.....	5.7 sq. ft.
Number of tubes.....	38
External diameter of tubes.....	2 in.
Length of tubes.....	6 ft. 3 in.
Heating surface of fire-box.....	54 sq. ft.
Heating surface of smoke-box.....	4.1 sq. ft.
Heating surface of tubes.....	120 sq. ft.
Total heating surface.....	158.1 sq. ft.
Heating surface per square foot of grate.....	27.74 sq. ft.
Pressure of steam per square inch.....	175 lbs.
Engine:	
Diameter of cylinders.....	5 1/2 in., 9 in., 15 1/2 in.
Length of stroke.....	14 in.
Revolutions per minute.....	150
I. H. P. at time of trial.....	40
Duration of trial.....	2 hours.
Water:	
Total weight consumed.....	1,140 lbs.
Weight evaporated per lb. of coal.....	9.8 lbs.
Weight drawn from jickets.....	84 lbs.
Weight consumed per I. H. P. per hour.....	14.25 lbs.
Temperature of feed water.....	55° F.
Coal:	
Total weight consumed.....	116 lbs.
Weight consumed per I. H. P. per hour.....	1.45 lbs.
Weight consumed per square foot of grate.....	10.2 lbs.

INDICATOR DIAGRAMS.

	Mean pressure.	I. H. P.
High pressure cylinder.....	54	13.3
Intermediate ".....	18	12
Low pressure ".....	7.5	14.7
Total.....		40.0

The crank shaft is carried in four bearings, the plunger blocks being one casting with the pedestal which supports the fire-box, and the frame of the engine consists of steel channel girders. The fly wheel is 5 ft. 6 in. diameter and 10 1/2 in. wide, and the total weight of the complete engine, but without water in the boiler, is 14,560 lbs. The most economical load, according to the makers, is 50 brake H. P. The dimensions of the engine and boiler, together with the results of a two hours' trial, as given to us by the makers, are contained in the following table, and we also reproduce some of the indicator diagrams taken by the makers during that trial. From these experiments it appears that the consumption of coal per I. H. P. is extremely low, and should equal economy be obtained in every-day working, Messrs. Marshall may be congratulated for having effected a very important improvement in steam engineering.

Col. George L. Perkins.

Those of the readers of the *Railroad Gazette* who find themselves so busy as not to open this paper on Friday or Saturday will probably turn to this page on a day appropriate to recalling the career of Col. George L. Perkins, Treasurer of the Norwich & Worcester Railroad, whose portrait is shown herewith. Colonel Perkins will, on Sunday, Aug. 5, be 100 years old, and, as is well known to most of our readers, is by far the oldest man in active railroad service in this country, or probably in any other. He was born in Norwich, Conn., where he now resides, and remembers seeing in 1799 a funeral service, with a procession through the streets, which was conducted at that place on the occasion of the death of George Washington. Colonel Perkins' title is not one of the ornamental kind so common nowadays, but was earned by service in the war of 1812. In that war he was a paymaster, and became acquainted with many of the noted American officers. He became a director in the Norwich & Worcester Railroad in 1835, before the completion of the line, and three years later was chosen Treasurer, and has continuously performed the duties of that office to the present time. Although the road has been operated by the New York & New England for several years, the accounts have been kept separate to such an extent that there was but little diminution in the amount of work done in the Treasurer's office, and the position was by no means a sinecure. Within the last two years, however, the system has been changed, and the office has been more like those of roads in general which are leased and operated by other companies.

Col. Perkins has been married 69 years. He is 6 ft. 2 in. tall, and of commanding presence, and bids fair to remain in active life a good while yet. The mere mention of the dates in his career suggest reflections that would fill volumes. The second and third generation of railroad officers are now taking an active part in the administration of affairs, and we are rapidly approaching the time when we can truly refer to ancient times in railroading; and yet here we have among us one who was in middle life before the first railroad track was laid in America and before a locomotive ever turned a wheel.

The photograph from which our engraving is made was taken two years ago, and the artist has made the reproduction somewhat younger than the photograph.

The Need of the Trans-Mississippi Territory—A Transportation Problem.

Revenues from railroads are primarily dependent upon population. The conditions which most readily encourage immigration are good wages, low rates of living, regular employment and salubrious climate. Most of these are assured by low and regular rates of transportation. Whatever, therefore, will tend to create and maintain a low, yet a profitable rate, will prove beneficial to the railroad investor.

There appears to be a general impression among railroad managers that competition, and especially that by waterways, which may be improved at government expense, is prejudicial to the interests of their lines. This impression, we think, is fallacious, as it will be found generally that those railroads which are doing the most profitable business are those which are parallel to navigable streams, and further, that it is not the long but the short haul that produces the greatest revenue. A notable instance of this will be seen in the New York Central & Hudson River Railroad, as contrasted with its more direct rival and competitor, the New York, Lake Erie & Western, connecting the same termini. Notwithstanding the canal competition, it is a fact that the net returns of the former greatly exceed those of the latter road, and that they are derived chiefly from the local business of the denser population.

In a recent analysis of the replies to the query of the Culm Committee as to the propriety of the U. S. Government

of the movement, cannot bear the rates to the sea, and the railroads do not get it at all. If, however, it were possible to ship on the West Gulf coast in vessels of large tonnage, it would put in motion an enormous volume of material from a tributary area which embraces about one million square miles and prove a source of revenue to the railroads bordering the coast at both the ports of clearance and entry. It is stated* that the loss to Texas alone resulting from the absence of a deep water port amounts to between twenty-five and thirty millions annually, and the same authority adds that the chances of obtaining such a harbor by Federal aid are "none whatever."

The commercial value of a deep water channel varies as the cube of the depth and the relation between the draught (in feet) and the tonnage is expressed by the formula

$$T = .13 D^3.$$

"The capacity for trade of a channel 10 ft. deep will be increased eight times if its depth is increased to 20 ft." If to 30 ft., it will be twenty-seven times greater. Thus the great importance of increased depth becomes manifest, and it is also evident from the above comments that the development of a deep water port on the Texas coast will be to so great an extent local as not materially to interfere with the present business of the railroads nor the Eastern commercial centres, but, on the contrary, it would stimulate the entire southwestern region into increased activity and prove of great benefit to its railroads, as well as



COL. GEORGE L. PERKINS.

TREASURER NORWICH & WORCESTER RAILROAD.

improving the internal waterways, about 13 per centum were found to be opposed to it, and all of these were railroad officers with the single exception of a stove manufacturer.

The benefits conferred by railroads in developing the country are inestimable. They have enormously extended the market range and lowered the cost of all articles of commerce. But at the present stage of their utility there is a limit beyond which they cannot profitably handle traffic, and unless some other means can be provided the produce and treasures of certain sections of the country must lie dormant or be allowed to decay for want of a consumer.

It is manifestly impossible to transport a raw material to the mill or manufactured products to the market when the cost of transportation would consume the value of the article. The limit of movement is a function of the rate by the distance. As the rate is lowered the distance is increased.

A policy therefore which decrees that all freights must go by rail, or not at all, is not only suicidal, but destructive of the best interests of the country. Thus the farmer who ships his grain, cotton or cattle from the remote sections beyond the Mississippi must pay a heavy royalty to reach the seaport or the foreign markets, and this cost of movement must come out of his profits. The consequence is that the number of farmers who are handicapped by heavy mortgages at high rates of interest is large and constantly increasing. Their relief and consequent prosperity must come largely from a reduction of the rates of transportation, and this may be secured by seeking and providing, where possible, a line of less resistance or less cost between their farms and the markets of the world.

Under the existing physical condition of the harbors of the Atlantic and Gulf coast the points of transshipment to vessels of deep draft are very few, and, excepting New Orleans, they are remote from the great interior basin; so that a large portion of the low priced products, which constitute the bulk

to its commercial, manufacturing, mining and agricultural interests.

So greatly has this necessity impressed itself upon the citizens of Colorado, Kansas and Texas, that for some time past it has been a prominent subject for discussion in the local papers, and at the Deep-Water Convention held at Fort Worth, on July 10-12, to consider the subject, a permanent committee was appointed, and the following resolutions were adopted:

Resolved, 1. That it is the sense of the convention that the commercial, agricultural, mining and stock-raising interests, not only of Texas, but of all the territory north and west thereof, as well as the commerce and trade of the United States with other countries, demand a first-class port on the coast of Texas.

2. That this convention believes that such port ought to be selected by a board of competent representatives appointed by the United States Government.

3. That the Senators and Representatives in Congress from the states of Texas, Colorado, Kansas and other states interested in securing a first-class port on the Gulf of Mexico be requested by a memorial from this convention to urge at once the appointment of a competent board of engineers by the United States for the purpose of selecting a location on the coast of Texas for a first-class port, to be secured in the shortest time, capable of admitting the largest merchant and naval ships, and at which the best and most accessible harbor can be secured and maintained.

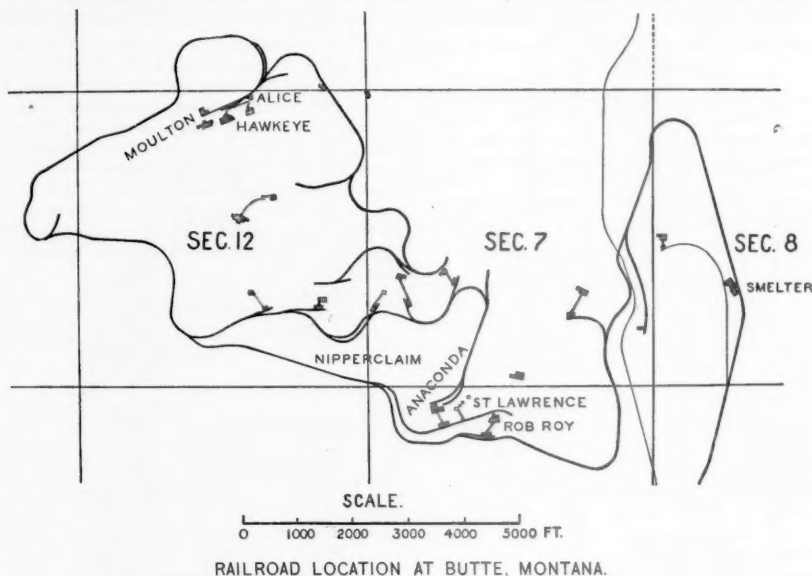
4. That Senators and Representatives be and are hereby earnestly requested to secure adequate appropriations by the Government sufficient in amount to give assurance of the continuous operation of the work to its ultimate and successful completion.

5. We endorse any effort of private enterprise to secure deep water on the Texas coast, and pledge ourselves to use our influence to induce the General Government to reimburse the outlay when 20 ft. of water shall have been procured.

6. Resolved, That this Convention request our delegations in Congress to ask of the Federal Government an appropriation

*By Hon. John Hancock.

†See Benson, Construction of Harbors: London.



tion of at least \$5,000,000 of money to give us a deep water port on the coast of Texas, to be raised by a special appropriation, leaving the mode, manner and place of expenditure to be determined by the Government.

These resolutions may be regarded as an evidence of the desire which exists for a suitable port, but as a means of securing that end the practical result is doubtless anticipated by the opinion of Judge Hancock already cited—since there is no proposed departure from Government methods which have been attempted for about twenty years past without producing any material benefit.

If a right line be drawn from New York to Galveston, it will pass through Philadelphia and Baltimore, which are all deep water ports. If this chord be bisected, between Baltimore and Galveston, by a perpendicular it will separate the country into two great areas tributary to the Gulf and the Atlantic, and if the depths of water over the bars on the Gulf coast were not limited to about 13 ft. as a maximum the commerce of this section would be enormously expanded without detriment to that of the Eastern sea-board.

The peculiar physical conditions existing on the Gulf, the efforts made to secure deeper water and the means by which that great desideratum may be attained will be stated in a subsequent issue.

LEWIS M. HAUPT.

Location of the Railroad to the Mines at Butte, Mont.

Butte began as a placer camp; later the silver and copper-bearing lodes were discovered. The completion of the Utah & Northern Railroad to that place gave a great impetus to the mining industry. The mines are situated on the western slope of the Continental divide, on a spur thrown out westward from the main range. The slopes are steep, but generally smooth, and are free from timber and underbrush. The points of the hills are sharp, and the ravines are deep and narrow. The Anaconda Company, who own a large number of mines in the vicinity of Butte, have their immense reduction works at the town of Anaconda, some 30 miles distant, and about 7 miles from the line to Garrison. These works were easily connected with the railroad system by a branch from Stewart. To serve this traffic, and to bring in the mining supplies for the company, and the milling supplies for several large silver works was the reason for building these lines.*

At the same time the probability of competing roads being built to Butte was considered, and the location was laid so as to occupy the ground as much as possible; so each spur deviating from the main line had its grades running in a different direction to those on the main line opposite to it.

To bring supplies to a mine, the spur must be higher than the floor of the hoisting works, and the one to carry away ore must be lower than the ore house. For safety and facility of loading, all should be straight and level for at least 200 ft. at the ends. The ore is hoisted to the surface and dumped into ore houses that are built on the side hill below the hoisting works, and from them the cars are loaded by gravity. The tracks for these cars were required to be 80 ft. below the floor of the hoisting works.

The problem was to serve a number of mines, most of them on steep and broken hill-sides and all at different elevations. This was done by continuing the main line six and a half miles up on the hill and throwing off from it branches and spurs.

The grade first adopted was 2.8 per cent., equated .05 per degree for curvature; maximum degree of curvature, 14 deg. These rates continued for about 5 miles, when it was found necessary to put in a mile and a quarter of 4 per cent. grade, and some curves of 15 degrees. The first spur is to the left and on a descending grade; the next three are switch-backs and are either level or on ascending grades. On the first of these it was necessary to use a 4 per cent. grade, as a line started farther back would lie so high on the side hill as not to give a tangent long enough for the needs of the ore house, even with the use of a 20 deg. curve.

The others were easy, a short one on a level and a second

* The average daily consumption of ore is now 1,100 tons, and with the additions and improvements being made in the concentrators and smelters at Anaconda, the amount will probably be doubled by the end of the present year.

one on the same grade as the main line. This last brings supplies to one mine and carries away ore from the other. This, and the one next above it, fork at or near the ends; one of these carries lumber and the other fuel.*

The next group of mines was the most difficult and expensive to reach, but it was done by a switch-back branch from the main line, with the same ascending grade as the main line (2.8 per cent.) for over a mile, and then descending on 3.2 per cent. grade to the end, half a mile farther, with seven spurs from it, either direct or as switch-backs. The first, second, fourth, fifth, and sixth of these are on ascending or level grades, and the third and seventh on descending. The longest of these spurs (the third) passes under the branch in order to get to the required position and elevation. It diverges to the right, curves around the point of a hill, and passes up a ravine, across which the branch is carried on a high curved trestle. This is the only one on which the ore is hauled up grade. The main line doubles back on itself to reach the large silver works near and at the end, and approaches within 750 ft. of a point on the line over four-fifths of a mile back, but is 75 ft. higher than it.

The other mines are near the top of the hill, where the slopes are gentle, and the only question was how to get to them and keep on or near the crest of the hill, with as little curvature and grading as possible. A branch (switch-back) was thrown off the main line near the end and from it a switch-back spur, from which two secondary spurs were run as switch-backs. All of these were to carry supplies to the mines, and were on descending grades, except the first 700 ft. of the branch.

The last curve on the main line contains over 160°. In that rough country it was practically impossible to run to an intersection. The connection was carefully made with an angle line, and the starting point of the curve calculated, and also the tangential distance for a curve of the same radius and half the angle. This gave points on the line at the beginning, middle and end of the curve. JAS. R. MAXWELL.

The Montreal and Toronto Approaches of the Canadian Pacific.

The Canadian Pacific seems to spare no expense or pains in developing and perfecting its system. The great operations extending its connections west of Sault Ste. Marie have attracted much attention lately, but meantime the company has been quietly at work improving its eastern termini.

The Montreal and Toronto line of the Canadian Pacific at present runs back of Toronto, or rather through the northern portion of the city to Toronto Junction, and thence reaches the union passenger station on the lake front in Toronto from the west, involving a loss in distance of about eight miles.

The company has recently completed the acquisition of right of way along the lake front of the city, and has acquired a large property immediately in the centre of the city's lake front, and is now engaged in building a loop line from the point of connection with its lines entering the city from the west to a junction with its Montreal line, about four miles east of the union station. Aside from the cost of right of way and station grounds, the chief item of expense involved in the construction of this line is the cost of an iron viaduct, 1200 ft. long and 100 ft. high, crossing the valley of the River Don in the eastern part of the city.

The construction of this new line will place the company in the most favorable situation possible, as regards both freight and passenger traffic in the city of Toronto, and will avoid the circuitous route above referred to. It is expected that the work will be completed by the first of May next.

The lines of the company have heretofore entered Montreal also by a similar circuitous route, approaching the city from the west, passing around by the rear and entering by the east. A new and expensive line is now under construction entering the city directly from the west, reaching the new passenger station of the company, now nearly complete in a

* Each of these mines uses about 15,000 ft. B. M. of lumber daily and several car loads of firewood.

most favorable position in the heart of the city. This station is approached by a masonry viaduct which will, when complete, be about 2,500 ft. in length.

This line will avoid all level street crossings in the city, the streets being carried under the line through masonry arches. By this costly structure the railroad company and the city will be saved from the necessity, which so many American cities now find pressing, of remodeling the city terminals at vast expense, and the Canadian Pacific is fortunate in being able to profit by the costly lessons of others.

This new entrance to Montreal will effect a saving in distance of 5½ miles in reaching the city from the west and the south, and together with the new entrance to Toronto the distance between these two important cities will be shortened about 14 miles.

The Glace Check Valve.

The accompanying illustration represents a form of check valve devised by Mr. A. B. Glace, roundhouse foreman at Rockland, Cal., on the Southern Pacific.

It is specially intended for use where the water is bad and difficulty is found with pieces of scale getting under the valve and causing the check to leak. When, however, three valves are used, it is hardly possible that all three will be simultaneously affected.



The cage is of the usual pattern, except that below the seat of the main valve there is a taper opening toward the water pipe, into which two extra valves fall and seat. These valves are guided by a round stem running into the main valve from the valve under it, and the bottom valve stem running into the middle valve. The main valve has wings working in the guide cavity in the cap.

J. E. Lonergan & Co., 211 Race street, Philadelphia, Pa., have recently commenced to manufacture this valve, which has been used for some time on the Southern Pacific.

Superintendent's Daily Summary of Reports.

The summarizing of the reports and records of the doings of a large railroad system for a single day in such shape as to make the account quickly intelligible and easily referred to by the superintendent or other managing head, is a problem that has engaged the thought and attention of many railroad officers. Many make either the mistake of requiring too much detail to be reported, thereby making unnecessary work for division officers and telegraph operators and rendering the report too voluminous for their own use, or go to the other extreme and require nothing to be sent in a systematic manner, thus giving occasion for many special inquiries in the event of cases coming up afterwards which involve a reference to the records. These records while in the hands of train and station men and others, are hard to get at quickly.

The best summaries of this kind which we have seen have been the work of superintendents who had had experience as telegraph operators, and we show herewith sample portions of that used by Mr. K. H. Wade, General Superintendent of the Wabash, who is an old telegraph superintendent and has seen varied service in that department. Mr. Wade's form is copyrighted, as will be seen from the sample, and is bound in a book whose pages are a little larger than those of the *Railroad Gazette*; two facing pages hold the record for one day. We regret that our space will not admit of showing the whole report, but we give the headings and enough of the manuscript filling-in to show the nature of the record. The trains shown are similar, so far as the record goes, to all the others. In the first table it will be noticed that train 43 started 8 minutes late, made that up and afterwards lost time again, the causes being as shown in the right hand side of the sheet. This table has 10 lines, one to a train, and the east-bound table for the same division has a similar number. Tables are provided for the other districts in the same manner.

The morning car report has a separate line for each of the nine districts into which the road is divided.

The record of stock trains is quite full, the names of all the regular shippers being entered in the report, so that the superintendent is ready to deal with these men in case of complaint without a minute's delay. There is space in the blank for 20 entries.

The summary of train accidents, it will be seen, is small. We trust it is so every day. The weather report explains itself. The letters N A, N B, N C, A X, A Y, K X, etc.,

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WABASH RAILWAY.
JOHN McNULTA, RECEIVER.
MORNING TELEGRAPHIC TRAIN REPORT.
First and Second Districts.

Time received, 8:50 a. m.

July 16, 1888.

WEST BOUND.

Train No.	Left Toledo.	Left Defiance.	Left Ft. Wayne.	Left Andrews.	Left Peru.	Left La Fayette.	Arrived Tilton.	TIME DELAYED AND CAUSE.								C S	
								Failure of engine. C A	Cold w/ thr or storms. C B	Connections. C D	Meeting trains. C E	Loading bag & oas. C F	Account track. C G	Account wrecks. C H	Hot boxes. C J	Other causes. C O	
N A	N B	N C	N D	N E	N F	N G	N H										
43	8	OT	3	10	10	10	12			8 m	5 m				10 m	3 m	
45	OT	OT	15 m	OT	OT	OT	OT				8 m				7 m	(getting baggage car.)	
1st, 99	OT			OT			OT										
2d, 99				58 m			OT										
45	15	OT	OT	OT						58	15						

EAST BOUND.

Train No.	Left Tilton.	Left La Fayette.	Left Peru.	Left Andrews.	Left Ft. Wayne.	Left Defiance.	Ar. Ived Toledo.	TIME DELAYED AND CAUSE.								C S	
								Failure of engine C A	Cold W' thr or storms. C B	Connections. C D	Meeting trains. C E	Loading bag & pas. C F	Account tr ck C G	Account wrecks. C H	Hot boxes. C J	Other causes. C O	
M A	M B	M C	M D	M E	M F	M G	M H										
44	16 m	OT	OT	OT	OT	OT	OT										
58	35			OT			OT			35					16 m		

Freight Trains, in good shape. All passenger trains make Toledo connection.

Received, a. m.

MORNING CAR REPORT.

July 16, 1888.

DISTRICTS.	East or north.			West or south.			At stations for east or north.		At stations for west or south.		Connecting roads interchange.				Loaded during twenty-four hours ending at 7 o'clock, a. m.									
	A			B			C		D		F				H									
	Load'd. A X	Empty. A Y	No. train's. K X	Load'd. B X	Emp y. B Y	No. trains. K X	Loaded. C X	Empty. C Y	Loaded. D X	Empty. D Y	Loads to F X	Empt's to F Y	Loads from G X	Empt's from G Y	Grain. H X	Stock. H Y	Coal from public. M X	Coal from priv. M Y	Miscellaneous. N X	For Toledo. N Y	For Detroit. R X	For Chicago. R S	For St. L. U X	
18th	50	112	4	88	22	3	15	7	58	7	53	52	106	27	2	2	40	5	54	10	1		57	
2d	77	64	6	159	28	6	2	3	71	27	53	54	61	18	1	8	5	3	48					
10th	82	139	7	184	13	6	6	1	1		1	1	2		4		6						1	

Car exchange with connecting lines, previous 24 hours.

STATIONS.	Loads to F X	Empty's from F Y	Loads from G X	Empty's from G Y	Stations.	Loads to F X	Empty's from F Y	Loads from G X	Empty's from G Y	Stations.	Loads to F X	Empty's from F Y	Loads from G X	Empty's from G Y	Stations.	Loads to F X	Empty's from F Y	Loads from G X	Empty's from G Y
Toledo	33	23	43	19	La Fayette	24	5	14	13	Chicago		2			Hannibal	50	20	55	27
New Haven	33	10	26	1	Danville					Forrest	10	7			Quincy				
Fort Wayne	12	16	19	6	Decatur					Springfield	4	8	17	3	Keokuk				
Peru					E. St. Louis	187	15	13	33	Jacksonville	3	4	4	3					
Huntington	3	2	15	1	Clymers	26	41	35	5										

RECORD OF THROUGH STOCK RUNS.

Train.	No. of cars.	Kind stock.	Consignee.	Where from.	Destination.	Left.		Left.		Arrived at.		Time delayed and cause.
S A	S B	S C	S D	S F	S G	S I		S K		S M		S N
1-76	10	Sheep	Paxton, S. & Co.	San Antonio	Chicago	Hann	8:40 a. m.	Springfield	3:35 p. m.	Bement	6:50 p. m.	
9	9	Cattle	J. Dolby	Norborne								

SUMMARY OF TRAIN ACCIDENTS.

For twenty-four hours ending 7 o'clock a. m., July 16, 1888.

DISTRICT.	Near what station. N S	No. of train. N T	Brief particulars. N P
17th	Monticello	1-95	Had car off track just north of crossing at Monticello, account broken flange, delayed 1 h. 25 m. No. 6 delayed 40 m. Damage slight.

WEATHER REPORT.

Weather, July 16, 1888.

DISTRICT.	Thermometer. H	Direction of wind. F	Kind of weather. G
G. Toledo	54	Calm.	Clear.
J. Fort Wayne	58	W.	"
K. Peru	60	N. W.	"
L. Tilton	70	E.	"
P. Tolono	73	N. E.	"

constitute a cipher, enabling the telegraph operator to send the report in a short space of time, the letter H, in the car report, for instance, taking the place of 9 words.

Valuation of Railroads for Taxation.

In an appeal before the State Board of Equalization of Indiana for reduced valuations on the properties of the Pennsylvania system, Mr. L. L. Gilbert presented some arguments that refer to the relations railroad values and taxes bear to the aggregate of the duplicate. Railroad property in Indiana, he said, bears its full share, or more than its full share, of taxation; and, as between the several railroads of the state, the Fort Wayne Company pays upon a valuation very greatly in excess of its proper proportion. The grand duplicate of the state for 1887 shows the value of taxable property to be \$757,147,713, the value placed upon railroad property for that year being \$62,092,439, or 8.2 per cent. of the total value of all property in the state as returned for taxation. The grand duplicate for 1881 was \$805,202,792, a reduction of about 6 per cent. having been made since 1881. But while other property in the state was valued about 6 per cent. less than in 1881, railroad property was increased (in addition to the amount which should be added for extension) or 6.9 per cent. It certainly cannot be true that all property in that state except railroad property was less valuable in 1887 than 1881.

Concerning the Pittsburgh, Fort Wayne & Chicago, he said: It has 152 miles of main track, passing through eight counties, all except Starke being wealthy agricultural counties and a number of them having large cities and towns with important manufacturing and other interests. In 1887 the assessed value of all property in these counties, including railroad property, was \$85,514,723, of which \$16,369,024, or 19.1 of the total was railroad property, and 5.8 of the total was the assessed value of the 152 miles of the P., F. W. & C., with its side-tracks, rolling stock and improvements. In the county of Starke the 78 miles of railroad pay 50.4 of the entire tax of the county, the Ft. Wayne paying 18 per cent. of the entire tax, and this on 12 miles of a single-track railroad.

As before stated, there were 5,679 miles of main track in operation in the year 1887, and the aggregate valuation of main track for that year was \$45,156,493, or an average of \$7,969 per mile, the assessment of \$25,000 per mile placed

on the Ft. Wayne line being 318 per cent. of the average, and while it has but 2.6 per cent. of the total mileage of the state, yet it is assessed 8.3 per cent. of the total valuation of main track, and beside paying the large proportion on main track, it is assessed, in addition, \$1,109,935 upon rolling stock, second track, etc.

We thought the valuation high at \$20,000 per mile, and now think that a careful comparison must satisfy you that this was true. While all other property has been reduced in value since 1881, the tax on money invested in railroads has been increased, so that property so invested now pays nearly one-tenth of the entire tax of the state.

TECHNICAL.

New Canadian Pacific Shops.

The new Canadian Pacific shops now building in Montreal include a passenger car shop 400 ft. diameter and two stories high; wood machinery shop, 400 x 100 ft., two stories high; blacksmith and machine shop, 300 x 100 ft., one story; store room, 350 x 90 ft., two stories high, and a foundry, 150 x 100 ft. The buildings are of brick and stone, and are estimated to cost about \$300,000, without tools, etc. When completed these works will give employment to about 1,000 hands.

New Sleepers on the Lackawanna.

The two new sleepers on the Lackawanna, built at the Pullman shops in Detroit, have just commenced running. They are several feet longer than any ever built there before, in fact, they are so long that it was necessary to take the bodies off the trucks and turn them crosswise to get them out of the space between the two parts of the shop. Several new agencies of comfort and safety have been introduced. Under each car are four tanks, two holding cold water, one hot water, and the fourth compressed air. By means of the compressed air the water is forced through pipes to the wash rooms, where both hot and cold water runs without pumping. Drinking water runs in the same way and is cooled by passing through ice. This arrangement will be appreciated by any traveler who has on a rough road tried to hang on with one hand and pump water enough to wash in with the other. Inside, the cars are finished in solid mahogany, and paneled with hand-painted plush, each panel specially designed for the place it occupies. The upholstery and curtains are of the very best material, and both upper and lower berths are provided with electric bells with which to call the porter at any hour. A convenient buffet is furnished, and also a library of 50

volumes for the convenience of passengers. The smoking-room is larger than usual, and finished in antique oak. Both cars are furnished with the newest pattern of Westinghouse air brake, and no improvement to increase their comfort or safety has been omitted.

The "Puritan."

The "Puritan," a somewhat larger vessel than the well known "Pilgrim," was launched from Roach's shipyard, Chester, Pa., on July 25. Some 3,000 visitors, including many railroad officers, witnessed the launch.

The "Puritan" is to run on the Old Colony Line between New York and Fall River, and will cost \$1,500,000 when she makes her maiden trip on Long Island Sound in June, 1889. She is the largest and most handsomely fitted up side-wheel passenger steamer afloat and is expected to make 21 miles or about 17½ knots per hour.

The Puritan is 420 ft. over all, 404 ft. on the water line, 52 ft. beam, 91 ft. breadth above guards, 20½ ft. hold, 63 ft. height of dome from floor, and 12 ft. draught of water; gross tonnage, 4,650 tons; estimated displacement, 4,200 tons. She will be propelled by compound surface condensing vertical beam engines, built by W. & A. Fletcher & Co., of New York. The wheels are 35 ft. diameter, and have feathering floats. The low pressure cylinder, 110 in. diameter and 14 ft. stroke, and the high pressure 75 in. diameter and 9 ft. stroke. The galleys frame for the walking beam is constructed of steel and iron, and weighs 35 tons. Both cylinders work on the same beam. The crank shaft is 27 in. diameter inboard and 30 in. outboard. The weight of engines and boilers, complete with water, is 1,300 tons. The engines are expected to develop 7,000 indicated horse-power, the weight of the engines per I. H. P. being 371 lbs. Eight Redfield return tubular boilers are used, the working pressure being 110 lbs. per sq. in.

Her hull is of steel, built on the longitudinal and bracket-plate system. She has 56 water-tight compartments and 6 water-tight bulkheads. Her main deck is of steel. Her saloon and state-room accommodations will be superbly finished in the choicest woods and finest upholstery, and she will have 110 more staterooms than the "Pilgrim." The total number of passengers accommodated is 1,200. Her steering gear is worked by steam.

A Cable to Australia.

It is said that the governments of Australia, New Zealand and Hawaii have agreed to subsidize a cable from Vancouver to Australia, and it is expected that subsidies from the Dominion of Canada and from the British Government will also be secured.



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EDITORIAL ANNOUNCEMENTS.

Contributions.—Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and in their management, particulars as to the business of railroads, and suggestions as to its improvement. Discussions of subjects pertaining to ALL DEPARTMENTS of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.

Advertisements.—We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay, EXCEPT IN THE ADVERTISING COLUMNS. We give in our editorial columns OUR OWN opinions, and those only, and in our news columns present only such matter as we consider interesting, and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.

The triple expansion non-condensing engine which is illustrated on another page gave on trial a remarkably low consumption of fuel, 1.45 lbs. per I. H. P. per hour. While such a great economy could not probably be obtained in every day practice, it shows what can be done by an engine which is essentially of the locomotive type. A very similar locomotive could be constructed by connecting the high and intermediate cylinders outside the wheels and leaving the axis of the low pressure cylinder on the longitudinal centre line of the engine, connected to a driving axle bent out of a solid oval bar, as is done by Mr. Webb in compound locomotives. As many practical men deny that an ordinary locomotive can be run for 3 lbs. of coal per I. H. P., the fact that this engine has run at half that amount is surprising. Where fuel is dear, the extra cost and complexity of the extra cylinder and valve gear would be amply repaid. The indicator diagrams show some over expansion, and the engine would probably work to more advantage when developing 50 per cent. more power.

A report has been circulated that the system of giving premiums for saving coal had been suspended as regards the passenger trains of the Pittsburgh, Cincinnati & St. Louis, with the result that the passenger trains were run more punctually. The report, however, was incorrect, and no change has been made in the system of encouraging an economical use of coal. It is generally found that the engineer and fireman who waste least fuel, lose least time. The idea that good firing means poor running is somewhat of a contradiction, for the attainment of high speed requires essentially the fullest development of all the energy that is stored in the engine and fuel, and this is but what good firing does.

An important consolidation of interests in the brake business has taken place. The Westinghouse Air Brake Co. has leased for a term of years the property and business of the American Brake Co. A fixed rental is guaranteed, and the American Company will receive a share of the profits of the driver brake business after the guaranteed rental is paid. The steam driver brake will be made by the American Brake Co., Westinghouse Air Brake Co. Lessees, and it is the intention to develop that part of the business to the fullest extent. It does not seem too much to say that this consolidation is in the direction of public interest. The application of automatic brakes to freight cars will doubtless be hastened by it, for there is no longer the temptation to wait and see what some one else will develop. The competition is narrowed down to well-known apparatus. If the American patents cover any devices that will make the automatic brake cheaper or more efficient, it is not likely they will lie unused. Considerations other than competition act to keep the price low and maintain the quality in air brake apparatus as in many other articles of commerce. That is, no

one will have it if it is not efficient, and the use of it will not be greatly extended now if it is not cheap. There is another way in which the consolidation may serve the public interest. This is peculiarly a matter in which uniformity of type is of the greatest importance. The efficient action of the brake requires that all apparatus in any train should be uniform. While the air brake is a robust machine, it is one in which very small fractions of an inch make great differences in the result.

A statement appeared some time ago in a manner which was calculated to inspire confidence in its correctness, that the consumption of fuel per freight car mile ranged from 1 to 1½ pounds, and as an example, the writer stated that a train of 30 freight cars was hauled at the rate of 30 miles per hour, with a consumption of from 900 to 1,350 pounds of coal per hour. As this amounts to a consumption of from 30 to 45 pounds per mile, or from 66 to 45 miles per ton of coal, this statement is rather remarkable, and in fact, few passenger trains burn as little coal as is here stated, and still fewer freight trains ever cover 30 miles of approximately level track in one hour. The actual average consumption on the Pennsylvania, which is a fair representative road, is about 4½ pounds per freight car per mile, and the lowest consumption of any division in the best month of the year is about 3 pounds per car per mile.

Another somewhat erroneous statement that has lately been put in circulation is that the speed of the fastest regular express train varies from 48 to 53 miles per hour, including stops. Had this statement read "excluding" stops it would have been more nearly correct. One train in this country is timed to run for a short distance at the latter speed, excluding stops, and a few trains in England running a considerable distance without a stop attain a slightly higher speed. Perhaps the fastest run in this country is made on the Pennsylvania by the train leaving Jersey City at 4:13, which reaches Trenton at 5:17, running 55½ miles in 1 hour 4 minutes, giving a speed of 52.3 miles per hour. The fastest run that can be said to fairly include a stop is made by the same train, which runs from Jersey City to Germantown Junction, 84 miles, in 1 hour 40 minutes, stopping at Trenton. This gives a speed of 50.4 miles per hour, including one stop, but such a speed is nowhere maintained for any distance, and the run from Jersey City to Philadelphia only gives a speed of 48 miles per hour. The fastest trains in England have for some years been two London and Manchester expresses running 203½ miles in 4 hours 15 minutes, including two intermediate stoppages. This gives a speed of very nearly 48 miles per hour, including stops. While we write, however, news comes that London to Edinburgh, 392½ miles, is to be traversed in 8 hours, an acceleration of one hour in a few months. This corresponds to a speed of 49 miles per hour, including stops, and if the train can be run to time, which seems doubtful, it will undoubtedly be the fastest running for any considerable distance.

While trains may be run over a level road, with easy curves, at 60 miles an hour, or over, in fair weather, in framing a time-table some allowances are made for rough weather and unforeseen delays. If this is not done, it is evident that the slightest delay of any kind will make the train late, and that as the engine has always to do its maximum it cannot make up lost time, and the slightest unfavorable circumstances will prevent its arriving on time. Punctuality can only be secured when trains are allowed some margin of time for unforeseen delays. The heavy cars now so generally used on through trains, are, of course, a serious obstacle to fast running, throwing greatly increased work on the locomotive in getting up speed and in ascending grades. It is sometimes argued that there is some natural law which prevents any material increase in the maximum speed of passenger trains. The highest speeds attained 40 years ago are seldom exceeded to-day; but it is not, therefore, fair to assert that the innumerable improvements in railroads have not been conducive to any increase of speed. The true explanation lies in the fact that while the advance of railroad progress has in some cases given us better and safer appliances for fast running it has, in other directions, rendered the attainment of higher speeds more difficult. While the heavier and stronger track gives the train a safer and smoother roadbed, the increase of traffic and the greater number of railroads have thrown more obstacles in the path of the train and increased the causes of delay. Each additional junction and crossing means a possible detention, and the same may be said of every

train that has to be side tracked for the "flyer." While locomotives have increased in power, they have also been increased in weight, so as to secure greater durability and lessen the liability to failure on the road. The cars have also been enormously increased in weight, partly with the same objects, but chiefly in order to give the passengers greater comfort and security. Until recently these changes effectually neutralized one another, and indeed the increased weight and frequency of trains would probably have caused a decrease in the speed had not continuous brakes been very opportunely introduced. A demand for higher speed has now arisen, and as the progress in the direction of more luxurious and commodious cars is in full vigor, the task of running a fast and profitable passenger train becomes almost impossible. The heavy and spacious cars seat so few passengers and require so many attendants that the heaviest train that can be drawn at high speed has but a very moderate earning capacity. The most hopeful means of securing a high average speed for long distances consists not in attempting to reach very high speeds on down grades and on favorable sections of the road, but to stop the waste of time occasioned by unnecessary stoppages and checks to the speed of the train. Much may be accomplished in this respect by the introduction of improved signals clearly visible at a distance, interlocked with the switches and worked on the block system. Such signals, when properly constructed and intelligently worked and maintained, may be said to be absolutely safe and reliable, and will enable trains to run at full speed through many points where caution now dictates a considerable reduction of speed in view of the very uncertain manner in which warning is given as to the existence of danger ahead. Generally speaking, the fastest trains already run under these improved conditions, and when these better appliances become more widely used, there can be no doubt that the number of trains running between distant points at 40 miles an hour, including stops, will be greatly increased.

A superintendent of one of the main lines between Chicago and the East lately said that on his fast passenger trains, the increase in speed from 30 to 40 miles per hour necessitated burning more than double the amount of coal. It is very evident that this increase could not be entirely due to the greater train resistances caused by the higher speeds, and further inquiry revealed the fact that the engines were rather small in proportion to the work they had to do, and any extra pressure in the shape of a longer train or a higher speed than usual resulted in a failure to perform the required duty. As the steaming of the engines was not sufficient in such cases, there was a constant attempt on the part of the firemen to improve it by shoveling in more coal. It can be readily seen that a large amount of the extra fuel used was not burned but was practically wasted. The large increase made in a few years in the carrying capacity of freight cars has necessitated an increase in engine power on the bulk of American roads. In fact the increase in work to be done has often taken place faster than the needed increase in engine capacity to handle the heavier trains, and in consequence the engine power on many lines is overworked and driven beyond an economical point. The most economical engine is that which has a reserve both in tractive power and steaming capacity under ordinary circumstances. Such an engine, when severely tried, as when starting upon heavy grades or in snow, can be worked up to its highest powers for a short time without damage. The performance of work that averages more than the normal power of the machine requires a constant straining of every part, with the result that the required duty is not properly or economically performed as regards fuel, while the engine has to be sooner shopped for general repairs, thus involving a larger expense for doing the same amount of work. This desire to have engines fully up to their work has led, however, to a mistake in the other direction; that is, of having the same heavy engine for all classes of service. In consequence allowance is not made for the lighter classes of traffic, and we see light suburban trains or branch freights being handled by engines large enough for the heaviest main line service, and in consequence there is a loss from unnecessary investment in first cost, extra wear of tracks and possibly larger amount of fuel used. The very increase of traffic we have referred to has widened the lines between the heaviest and the lightest trains. In a laudable desire for uniformity the master mechanic may go too far in replacing his lighter engines with heavier types, thus leaving none for the economical working of the lighter

traffic. Economy often requires that there shall be a classification of engines into different styles according to the varied service of a large trunk line. But unfortunately where traffic is heavy and increasing, engines are generally scarce, and the master mechanic often has no suitable engine for a particular train, and is often thankful if he has any engine at all to work the traffic. We have lately seen a fast suburban train of three cars run into Jersey City with a heavy mogul locomotive, and this is but an example of the straits to which the motive power departments of many roads are reduced by the demands of the traffic exceeding the supply of suitable locomotives.

The communication on another page, from Prof. Haupt, calls attention to the agitation for harbor improvement on the Texas coast, and to some of the benefits to be expected from it. Speaking generally, it will not be denied that a policy which will promote the prosperity and growth of a great area will be beneficial to the railroads. It is even possible that the development of good, deep water harbors on the Texas coast would eventually increase the earnings of the railroads which reach the great Atlantic ports, for they could hardly help sharing in the prosperity of the Southwest, notwithstanding the diversion of certain traffic to southwestern ports. But when we come to particulars this argument for the improvement of Texas harbors is not likely to appeal very strongly to the railroads east of the Mississippi River. To-day they see freight which used to go directly across the continent taken by steamer to New Orleans, and thence by rail to Denver and to Idaho and Oregon. That particular diversion is not very serious yet, but it is enough to suggest what it might be with steamers of the largest class running to the Texas ports. To-day the merchants of New York and Chicago and other large termini are fighting against the growing tendency to make them way stations as far as certain important traffic is concerned, and it is not to be expected that such cities, or the railroads centering in them will take the largest or most disinterested view of southwestern harbor improvements.

The argument that water competition by increasing the prosperity of a region adds also to the prosperity of the railroads in that region does not seem to be conclusively illustrated by the instance of the New York Central and the Erie. It is true that one pays dividends and the other does not, but the same is true in a comparison of the Pennsylvania and the Erie. Moreover, there is an apparent misapprehension of the relative importance of local and through traffic on the two roads. For the year ending Sept. 30, 1887, on the Erie proper, 63 per cent. of earnings from freight and passengers was from local business, and on the New York Central & Hudson River the local business contributed 40 per cent. Taking the freight business alone the difference is still greater. On the Erie 61 per cent. of the earnings from freight was from local traffic, and on the New York Central 24 per cent. These figures are in themselves misleading, for over 30 per cent. of all the freight earnings on the Erie was from local coal, a business of which the Central has very little. This item, therefore, invalidates the comparison of local and through earnings of the two lines for Prof. Haupt's purpose. The operating expenses of the Erie, as compared with gross earnings, are not very much greater than those of the Central, but the comparative difference in fixed charges is enormous. In that, rather than in conditions of geography or of local population, lies the explanation of the fact that one road makes money for its stockholders and the other does not.

But all this is really aside from the question. The Southwest ought to have, and doubtless will have, deep harbors on the gulf coast, and the question is how to get them. Whether or not it should be by Federal aid we will not now stop to discuss, but, decidedly, it should not be so long as the harbor improvements are carried on as they now are. When something like the proposed bureau of harbors and waterways is established, and work can be thoroughly studied and organized and appropriations can be intelligently made, much proper opposition to government aid to such works will disappear.

Traffic and Expenses on the Pennsylvania System.

The report of the Pennsylvania Company is ordinarily little more than a financial summary of the results of the year on a number of connected lines whose individual operations have been published separately. This year it has much more interest. It shows, in a comprehensive form, the results of the Inter-state Commerce law upon one set of roads which has been specially affected by it, and thus has decided interest from the standpoint of the traffic de-

partment as well as the financial. It should in fairness be remarked that as the returns for 1887 cover three months before the law went into effect, these conclusions are not as distinct as they otherwise might be.

For statistical purposes, the Pennsylvania company divides its lines into two groups, the Northwestern and the Southwestern; the two being not far from equal in traffic, though very different in extent. The former includes eight roads with an aggregate length of 991 miles; the most important being the Pittsburgh, Ft. Wayne & Chicago, and the Cleveland & Pittsburgh. The latter includes eleven roads with an aggregate length of 1,778 miles; the most important are the Chicago, St. Louis & Pittsburgh, the Pittsburgh, Cincinnati & St. Louis, the St. Louis, Vandalia & Terre Haute, the Little Miami, and the Jeffersonville, Madison & Indianapolis.

The changes in traffic were as follows:

	Northwestern system.		Increase per cent.
	1887.	1886.	
Tonnage.....	15,576,000	13,782,000	13
Ton mileage.....	1,581,000,000	1,377,000,000	16½
Passengers.....	5,831,000	5,316,000	9½
Passenger mileage.....	158,000,000	131,000,000	19½
	Southwestern system.		Increase per cent.
	1887.	1886.	
Tonnage.....	16,615,000	14,858,000	11.5-6
Ton mileage.....	1,777,000,000	1,522,000,000	16¾
Passengers.....	6,471,000	6,002,000	7.5-6
Passenger mileage.....	177,000,000	161,000,000	10

While the tonnage and ton-mileage have both increased, it will be noted that the latter shows more change than the former. In other words, the length of haul has increased also. How great this change is we have no means of knowing. With the accounts kept by separate divisions, a single ton of freight may be, and often is, counted more than once. The attempt to determine the average length of haul by dividing the ton-mileage by the aggregate tonnage reported on the separate divisions will always give too small a result; and the error will be larger the greater the proportion of through traffic handled.

Figures of train mileage and train loads are not given in the general report of the Pennsylvania Company. The financial results of the traffic are as follows:

NORTHWEST SYSTEM.				
	1887.	1886.	Inc.	Dec.
Earnings per ton per mile, cents.....	0.76	0.72	0.04	....
Cost.....	0.50	0.48	0.02	....
Profit.....	0.26	0.24	0.02	....
Earnings per passenger per mile, cts.....	2.30	2.20	0.10	....
Cost.....	1.62	1.48	0.14	....
Profit.....	0.68	0.72	....	0.04
SOUTHWEST SYSTEM.				
	1887.	1886.	Inc.	Dec.
Earnings per ton per mile, cents.....	0.73	0.70	0.03	....
Cost.....	0.55	0.54	0.01	....
Profit.....	0.18	0.16	0.02	....
Earnings per passenger per mile, cts.....	2.41	2.36	0.05	....
Cost.....	2.22	2.27	....	0.05
Profit.....	0.19	0.09	0.10	....

Two things will be noted in connection with this table—an increase of earnings per unit in every case, which is not at all surprising, and an increase in expenses per unit in every case but one, which is quite the reverse of what would naturally be expected.

The increase of earnings is due to the fact that rates in 1887 were on the whole so well maintained. But the difference in the case of the Pennsylvania is probably more marked than on other lines, because fewer reductions in local rates were necessary to adapt the tariffs to the new law. In fact, it has been the policy of the Pennsylvania for a long time past to make its rate-sheets conform to the short-haul principle. The violations of this principle on the Pennsylvania were due to special rates much more than to unequally arranged tariffs; and the section of the Inter-state Commerce act which prohibited special rates had the effect of leveling everything up to a maximum, rather than of producing increase at some points and reduction at others, as was the case on most roads.

But why should expenses have increased at the same time? There are three possible explanations: Either that the character of the traffic has become less economical, involving more work per unit, or that larger sums have had to be paid for the same amount of work; or, finally, that the difference between the two years in this respect is more apparent than real, not being directly chargeable to this year's traffic. We shall find the last to be the truest explanation.

On some roads there is undoubtedly a loss of economy in handling traffic under the Inter-state Commerce law. But this is probably not the case on the Pennsylvania system. The effect of the short haul clause, as we have more than once pointed out, is to give the Pennsylvania system a somewhat larger share of the through traffic than it would otherwise receive. This is indicated to some extent by the figures with regard to length of haul. It is indicated still more clearly by the obvious satisfaction of the company's authorities with the workings of that clause. It is true that the figures before us tell but a part of the story. They do not tell how far irregular traffic may have dis-

placed that which is more regular. But the detailed reports of the individual lines which have hitherto come to hand show that there cannot be any great loss from this source. So far from anything like decrease of car space utilized, the Chicago, St. Louis & Pittsburgh shows an increased average train load from 209 tons in 1886 to 229 tons in 1887. This does not look as though the economy of the Pennsylvania company had suffered from the workings of the act.

Nor is there any change in the ordinary items of expense sufficient to account for the difference in cost. Coal was higher in 1887 than in 1886; but not enough higher to make a great difference. Iron was higher; but the amount of new iron used on established lines like those of the Pennsylvania is not what it is on undeveloped roads. Nor was there any such change in rates of wages as could account for the increased expenses per ton or passenger mile under the conditions existing on the Pennsylvania in 1887.

Let us now examine the remaining alternative and see whether the increased cost in 1887 was presumably due to the fact that the traffic of that year was loaded with expenses which did not distinctly belong to it.

The general report does not give a summary of the various items of operating expenses in tabular form. But they are given separately for each company, so that we can look at them for ourselves. Let us take the four companies which are financially the most important—two on the Northern system and two on the Southern—and see whether the change in operating expenses is due to increased cost of transportation or increased expenditures for maintenance of way.

The total operating expenses of these four roads were as follows:

	1887.	1886.
Fort Wayne.....	\$6,988,000	\$5,847,000
Cleve. & Pitts.....	2,079,000	1,028,000
P. C. & St. L.....	4,177,000	3,131,000
Chic. St. L. & P.....	4,311,000	3,966,000
	\$17,395,000	\$14,572,000

While the amounts charged for maintenance of way were as follows:

	1887.	1886.
Fort Wayne.....	\$1,332,000	\$986,000
Cleve. & Pitts.....	391,000	249,000
P. C. & St. L.....	1,435,000	602,000
Chic. St. L. & P.....	658,000	691,000
	\$3,215,000	\$2,231,000

These figures show that while operating expenses in general increased 19 per cent., those for maintenance of way increased 44 per cent. Without the charges for maintenance of way the other elements of expense increased a trifle less than 15 per cent.; or not so much as the volume of traffic on the four roads in question. Leaving out maintenance of way, the expense per ton mile, and probably also per passenger mile was less in 1887 than in 1886. No less striking is the result when we compare the differences on the different roads. The Chicago, St. Louis, & Pittsburgh Railroad alone among the four shows a reduction in maintenance expenses; it also shows a reduction in cost per ton and passenger mile, and is the only one of the four which does so on both these figures. Of the other three roads we find that on the Fort Wayne

The volume of traffic increased about 20 per cent.; Expenses for transportation and motive power increased about 19 per cent.; Maintenance of way increased about 65 per cent. On the Cleveland & Pittsburgh: The volume of traffic increased about 7 per cent.; Expenses for transportation and motive power increased about 24 per cent.; Maintenance of way increased about 56 per cent. On the Pittsburgh, Cincinnati & St. Louis: The volume of traffic increased about 17 per cent.; Expenses for transportation and motive power increased about 17 per cent.; Maintenance of way increased about 71 per cent.

Was this enormous increase in maintenance in any way directly chargeable to the traffic conditions of the year 1887? It does not appear that it was. Taking the lines of the Pennsylvania Company as a whole, it seems probable that 1887 was a less destructive year than 1886 as far as weather was concerned. The fact was that the company had the money to spend in 1887 and did not have it in 1886; and it took the opportunity at once to make some important expenditures upon its property, and at the same time prevent its profits from appearing to an envious public unduly large. We do not find fault with the company for this course of action. But we object to the inferences which they deduce from it as to changes in the cost of handling freight. Had they simply spoken of "expenses" per ton per mile, as the New York Central does under similar circumstances, they would at least have been technically justified in their statistics. But to count increased maintenance expenses due to a change in the policy of the company, as part of the cost of individual shipments of freight is a per-

version of facts. As far as it means anything, it misrepresents the actual state of the case.

We lay special stress on the matter at present, because the Inter-state Commerce Commission seems disposed to make obligatory upon all railroads the presentation of facts in this form. A few weeks ago we objected to the attempt to divide up matters which were properly indivisible, on the general ground that it produced arbitrary results. But here we have a stronger case against the system. It gives results which are positively misleading. If this be its effect upon a railroad system which has long stood as a model of honest and careful operation, what can we expect of it elsewhere?

Rails and Tests.

The unsatisfactory results of any system of testing rails that has yet been employed, and of any specification of chemical composition, are sufficiently demonstrated by the fact that such attempts to determine in advance the quality of rails are much less commonly employed and are much less relied upon than they were only a few years ago. So far as we can ascertain few of the larger railroads require physical tests at the mills, nor do they require detail analyses of each blow. The drop test has so far gone out of use that at one great rail mill the testing apparatus had gone to pieces from disuse and had lately to be reconstructed when a customer required drop tests to be made. Torsional and bending tests on small specimens have also pretty much gone out of fashion.

In England, apparently, physical tests are still in ordinary use. At least a technical journal of London, in a late issue, gives some particulars of the tests of rails which are in use on certain English lines. On the London & Northwestern a bullhead 85 lb. rail must stand without breaking a permanent deflection of 3 in., produced by a weight falling not less than 20 ft. on a piece of rail placed, head up, on supports 3 ft. apart. On the Midland the bearings in tests are to be 4 ft. 9 in. apart for 85-lb. rails and 3 ft. 4 in. for 70-lb. The rails are bullhead. Three blows of a drop, one ton weight, falling 12 ft., must not break the rail, and 20 tons "applied frequently" must not produce permanent set. The flange rail of the Metropolitan, 86 lbs. per yard, placed on knife-edge bearings, 5 feet apart, must bear a load of 40,000 lbs. with a deflection of not more than 1 in., and a maximum load of not less than 70,000 lbs., and deflect 9 in. without breaking. The flange rail of the Indian State Railway, 63 lbs. per yard, on bearings 3 ft. apart, must sustain a load of 15 tons for half an hour with a deflection of not more than $\frac{3}{16}$ in., and must bear without breaking two blows of a 1-ton drop falling 15 ft. The only chemical specification given requires carbon not less than 0.3 or more than 0.45; silicon and sulphur, not more than 0.06 each, and no other substances except manganese and iron.

In this country it is a common practice to buy on a guarantee of five years service and to depend largely upon that guarantee and upon the reputation of the mill. Probably also those companies which buy intelligently all insist on careful inspection at the mills and occasional analyses, to make sure that the carbon, particularly, is kept within specified limits. The inspector ascertains that mechanically the rails are up to the standard, but seldom attempts more than that.

Nevertheless, although the makers and users have discovered that in the present state of knowledge the physical properties of rails cannot be fixed by a formula, and that the wearing qualities cannot be determined by any tests yet employed, still there is progress. At least the largest users and most careful observers tell us that rails to-day wear better and break less often than they did a few years ago. This, we take it, shows that some of the mistakes of former years, both in mixtures and in processes employed, have been discovered and abandoned; but it does not show much more. The wide disagreements amongst investigators as to what constitutes the best rail steel, and what are the correct manipulations, and the uncertainty of the product, show that the art of rail making is still very imperfectly developed. In the single matter of hardness, for instance, while some of the mills are turning out harder rails than they were one year or two years ago, and doubtless increasing in that way the wearing quality of their product, there are many who think that rails are already too hard for safety, at least with the sections used. That one step has been taken with no certainty, and there is fear that it may have gone too far.

Considering how much is not known about rails it is not strange that tests and analyses should be given up, and it is not at all certain that knowledge is yet so far

advanced that it is possible to devise any adequate system of tests. That is, we don't know that we know what we want to test for. We don't know what combination of chemical and physical properties will give the best results. Within some limits there are, no doubt, a certain chemical analysis, a certain degree of density, a certain tensile strength and a certain elasticity which combined will give the best obtainable rail, but who knows what ores, what treatment of the ingot, what method of rolling and what finishing heat will give the nearest approach to this ideal combination? But this uncertainty as to what we are looking for is only one reason for the futility of physical tests. Another reason has always been the impossibility of imitating in the tests with any approach to accuracy either in kind or in degree, the conditions to which the rail is subject in service.

Certain qualities have been laid down theoretically as necessary to a good rail, and then those qualities have been sought for in laboratory tests. Of course this method has not been without good results, but it has also had some pretty bad results, and it is suggested that it would be profitable to begin at the other end, and learn intimately the history and the properties of rails which give good and bad wear in the track. In a paper presented at the Boston meeting of the Mining Engineers, Mr. F. A. Delano, of the Chicago, Burlington & Quincy, presented a very sensible plan for such studies by the larger users of rails. His suggestion is that a test piece one foot long be cut from each end of one rail out of every 1,000 tons; that the rails to be comparatively tested be put in the track where they would have practically identical service, and so marked that they could be accurately identified. Then, when the service record of a rail is known, its physical and chemical properties could be carefully determined from the test pieces. The mill history of the rail should also be accurately known. Then, knowing what certain rails have endured, it would be possible to know with great fullness what properties they had. The result of a great number of such observations would surely teach us what a good rail ought to be made of and how it ought to be made, and knowing these things, it might be possible to formulate a system of tests and analyses which would determine in advance whether or not a rail would wear well.

A "Mistake in Orders."

A butting collision which occurred on the Norfolk & Western, near Lynchburg, Va., on the night of July 21, deserves more than passing notice. Two engineers, one fireman and five colored gravel-train laborers were killed. The destruction of property was not large, and the lessons of the disaster are not likely to sink very deeply into the memories of those not intimately associated with it; but, whether one has or has not a feeling of compassion for those who mourn the loss of these men (whose deaths will not cost the road \$5,000 apiece), and whether one does or does not regard the loss of \$10,000 to \$50,000 occasionally by a train accident as an unavoidable "incident" to be regularly expected in train running, the facts of the case should be placed on record, because the causes, which were somewhat complicated, are such as may occur at any time on some roads, and are—some of them, at least—such as need to be constantly guarded against on all roads.

The order of the stations on the division where the collision occurred is as follows, going east: Roanoke, Blue Ridge, Liberty, Bellevue, Forest, Island Yard, Lynchburg. (We omit those not necessary to an understanding of the case.) West-bound trains (odd numbers) have the right to the road. From Blue Ridge to Forest the grades are such that east-bound engines frequently leave their trains at the latter place and return empty to Blue Ridge or Roanoke for more cars. On the night in question, freight No. 58 (eastward) consisted of four sections, and freight No. 57 (west-bound) consisted of three. The work train, engine 42, wanted to go from Liberty to Lynchburg ahead of 58, and so was made first section of that train; and an empty engine returning for more cars was made the first section of 57 for a part only of 57's journey, that is, from Forest to Roanoke.

The orders given were as follows:

(Order No. 105.)

ROANOKE, July 21, 1888.

For No. 58, engines 171, 7, 178 and 169 and engine 42. Engine 42 will carry signals and run as First (1st) No. 58 from Liberty to Lynchburg.

No. 55, of July 21, is annulled between Island Yard and Roanoke.

Engine 1 will carry signals and run as 1st No. 57 from Forest to Roanoke.

First and second 57, engines 1 and 172, and First, Second and Third 58, engines 42, 171 and 7, will meet at Bellevue. First, Second and Third 58 have right of track to Forest against Third 57.

J. C. C., Supt.

(Order No. 114.)

ROANOKE, Va., July 21.

First and second No. 58—engines 42 and 7—have right of track to Island yard against third 57.

J. C. C., Supt.

The clearance card issued to the work train reads thus:

FOREST, July 22, 1888.

"Conductor and engineer first 58. I have no further orders for your train. Signal is out for second, third, fourth and fifth 58."

JENKINS, Operator."

The conductor of the work train testified before the Coroner that he ran on Order 105 from Liberty to Forest; that he passed first and second 57—engines 1 and 172—at Bellevue as indicated in that order; and that when he received Order 114 at Forest and the clearance card also, he understood it to mean that he had the right of way and could proceed as directed.

The collision occurred east of Forest. The engine of the work train was running tender first, and the laborers were sitting on the platform cars, it being a moonlight night. In a hollow (both trains descending) this train met that section of No. 57 which was second east of Forest, but which would have been third after it passed that point. The trainmen had already met a second 57, and their assumption that Order 114 gave them the right to the road over the next section was the immediate cause of the collision.

At least three parties shared the responsibility for the collision. First, the dispatcher did not strictly follow the duplicate order system. The second section of 57 (which was in collision) did not have copies of all the orders given against it. In this particular case the orders given the east-bound trains were technically correct, but second 57 did not know that its rights were to be infringed at Forest until it reached Forest. The alleged reason for not giving all the orders to this train at Lynchburg is that it would have confused the conductor by a multiplicity of unnecessary ones. But, however this may be, the slowness and circumspection necessary to a strict compliance with the duplicate system would tend to the detection of weak or ambiguous points by dispatcher or trainmen before harm ensued, and the rule requiring preferably only one movement in an order might have been more carefully respected.

Second, the operator at Forest ought to have stated in his clearance card that his signal was out for second 57. This, if carefully read by the conductor would have appeared wrong, as he had already passed a second 57; it would have at least reminded him that third 57 was not the next train expected by the operator. The operator says he told the conductor to "pull out after second 57 arrived;" but the conductor denies having heard such a remark.

Third, the conductor and engineer did not carefully weigh the words of the order. It is said that they were familiar with the practice of running trains for a portion of a trip ahead of regular trains and making them a section of the regular, and so should have discerned at once that second 57 west of Forest and second 57 east of that place were two different trains. This throws the immediate responsibility upon them. They were out late at night and impatient to get home.

But conservative railroad men can hardly fail to agree with the coroner's jury that the orders were confusing and that the system was really at fault. It would have been better to send separate orders for the different movements if for no other reason than that separate pieces of paper would naturally invite individual consideration, each for itself. There is weight in the argument that numerous messages confuse an engineer or conductor, but we certainly cannot expect to limit the number given to a single train to less than, say, three; and if men can be trained to adopt a good rule for placing in proper order and keeping in a proper place before their eyes *three* orders, they can be depended upon to follow the same rule with six or twelve.

The invariable use of the engine number in orders would tend to prevent mistakes of this kind, though there appears no reason to think that it would have made any difference in this case.

The weakest point in the whole chain, however, is the dependence placed upon the men's familiarity with the *practice*. The likelihood of any one making the very mistake that was made; of assuming that after a second section had passed the next train *must* be the third section, seems to be admitted, we infer from the evidence; and but for the fact that the men were all acquainted with the practice of changing the numbers of sections at intermediate points, the danger of making such changes would apparently be admitted by the officers of the road. The use of a *system* which depends for its safety upon men's familiarity with the local circumstances under which it is operated, is not tolerable when a better system is available.

To run a freight as extra instead of tacking it on to the head of a regular train would doubtless make more work and care for the dispatcher and often necessitate issuing more orders than would be necessary under the prevailing practice; and it would certainly remove one element of simplicity which exists in the present practice; but in the view of that large class of officers who believe in having the very best dispatchers and in depending upon them to bear as many as possible of the burdens imposed by the use of telegraphic orders, the plan of running extras and making any number of meeting points for them would quite likely be preferred to that of adding sections, which partially relieves the dispatcher but throws additional care on the trainmen. The Michigan Central goes to the extreme of treating nearly or quite all its trains as extras, the dispatcher making their meeting points and deciding in each case which train shall take the side track. This of course involves a great many orders, but the record of the Michigan Central is adduced as evidence of the success and correctness of the system.

With a good system of identification of trains, such as placing numbers on both headlights and caboose, which is now practiced by a number of roads, there would seem to be no danger and increased simplicity in using letters or some special designation other than a simple number on trains sent in advance and on the schedule of a regular train. If that turned-back engine had been made 57 A or 57 B, it would not have been necessary for the other 57's to change their identity.

The Wootten Fire-box.

The *Locomotive Engineer* writes as follows in reply to the letter from Mr. J. Snowden Bell, of Pittsburgh, Pa., which appeared in a recent issue:

"The writer is unduly 'soon' in his remarks, as perhaps we were in ours. The item that stirred up Mr. Bell was written when a report was published in the *Railroad Gazette*, stating that a test had been made with engines with the Wootten boiler and of the wagon top, and giving the Wootten a big record over the latter, stating that no more of them would be built. But the engineer of tests of this road has now come forward and corrected these statements.* Now we will say what we believe to be the truth.

"The Wootten fire-box does just what its inventor intended it should—burns very fine coal (buckwheat size)—it does not and cannot burn culm or dirt. We claimed that the fire-box was too big, because no man could keep the grates covered as they should be; this is proven by Mr. Cushing's experiments. He uses the Wootten box, remember, not the Milholland, but has made it very much narrower, and the tests just completed show that it does better than the extra big box. We believe that the new shape of box will be easier to stay and keep in shape than the old boxes—their weakest point. The Wootten fire-box engines on express do not burn buckwheat coal, because with this fuel it is necessary to clean fires very often—they use lump coal.

"The new Cushing engines are heavy, but they have modernized Wootten fire-boxes, their superiority and economy have been established, and we venture the assertion that the Wootten Locomotive Co. will in the future sell more of this style than of the old style."

The following appeared in these columns Jan. 6, 1888:

"The report that the Philadelphia & Reading are abandoning the Wootten fire-box is incorrect, and probably arose from the fact that in future it has been decided not to use the Wootten fire-box on all engines indiscriminately, but only on those where the fine or dirt coal can be burnt."

This is, we believe, still substantially correct, and we are informed that at present the number of Wootten engines on the Philadelphia & Reading is amply sufficient to burn all the waste or dirt coal available. The decision to build some engines with a smaller fire-box was arrived at on these grounds, and not because the Wootten fire-box was unsuccessful.

The fact that the following paragraph has been going the rounds of our esteemed contemporaries, shows that it is not universally known to technical editors that men who live amid violent noise and clatter, boiler-makers for instance, often have their hearing so affected that they are deaf or unable to hear an ordinary conversation in a quiet place, although capable of hearing perfectly in a noisy boiler shop, just reversing, in fact, the experience of the ordinary visitor.

"A short time since an engine driver on a line having its terminus in Dublin was found to be deaf. A specialist of great reputation tested his infirmity, and found that in a perfectly quiet room the man could not hear conversation carried on within a foot of where he stood, and he was accordingly suspended. The driver protested that in that quiet room he might be deaf, but that was not the point. He had no business in quiet rooms. He was a driver, and when on his engine, with the clatter and clang and throbbing in his ears—most certainly no aid to hearing in ordinary circumstances—he was not deaf in the least. The physician put these strange assertions to the proof, and to his astonishment found that the man was perfectly accurate in his statements. Deaf as he undoubtedly was amid ordinary surroundings, his hearing when on his own engine was so acute that he could understand quite well not only ordinary conversation, but could catch soft casual remarks and low whispers—the engine going all the time at high speed—which the keen ears of the doctor entirely failed to hear. He was reinstated in his position, and the estimable physician has materials for an essay which will not only interest, but probably amaze professional aurists."

The probable explanation of a non-professional is that the ear, like the human body and most of the handiwork of Nature, gradually becomes accustomed to its surroundings, and that as an ordinary person is deafened in a boiler shop and unable to sleep in an old fashioned mill, the boiler maker can only hear amid the clamor to which he is accustomed, and the miller wakes when the mill stops.

A locomotive runner ought, however, to be able to hear well whether his engine is running or standing. A man whose hearing is in any way affected has no business in the out-door service of a railroad, and is a source of danger both to himself and others.

Some time ago a movement was set on foot to raise by subscription a fund for the benefit of the widow and children of Mr. W. R. Kutter, who died at Berne, Switzerland, May 6, leaving his family destitute. Mr. Kutter is most widely known to scientific men from the investigations which led to the determination of the formula, which bears his name, for the mean velocity of water flowing in pipes and channels. He had lived in the plainest way and worked modestly and faithfully, and placed the world under obligations which can never be repaid. Yet when he died, quite an old man, he left a wife and young children entirely unprovided for. Mr. Rudolph Hering and Mr. John C. Trautwine, Jr., have nearly completed the translation of his chief work, in which he describes the researches which resulted in the development of the formula of Kutter and Ganguillet, and have in-

* The result of these tests was published in the *Railroad Gazette*, June 29, 1888. It will, however, be seen that they do not in any way refer to or bear upon any statement which appeared in the *Railroad Gazette*.

terested themselves in bringing to the attention of the profession the need of his family. The *Engineering News* has undertaken to receive and forward subscriptions, and up to the date of its last issue had received \$845. We take pleasure in bringing this matter to the attention of our readers, and feel sure that any contribution to the fund sent to the office of that journal will be well bestowed.

The following letter appears in a contemporary:

"Editor National Car and Locomotive Builder:

"My attention has been called to a paragraph in your issue of this month, Vol. 49, No. 6, page 85, i. e.:

"Mr. Jacob Johann has resigned his position as Superintendent of Motive Power and Rolling Stock of the Texas & Pacific Railway. 'Need of rest' is given as the cause of resignation. Those well informed respecting the affairs of the road say that the resignation was sent in because the company is allowing the rolling stock to run down deplorably that dividends may be paid, and Mr. Johann did not propose that his name should be associated with the dilapidated machinery for which he was responsible."

"In the opinion of the management quite a sufficient sum of money was spent to keep the rolling stock in first-rate condition. Mr. Johann's resignation was not tendered for the causes stated above, nor was the rolling stock allowed to run down that dividends might be paid. This is the least I can say, in justice to those who control the property, as well as the holders of its securities. JNO. C. BROWN, Receiver."

A correspondent, writing from one of the great Western roads, says:

"Quite recently we had an example of what severe service rails may be called on to stand. About three miles of track was so badly kinked that the rails had to be renewed. This kinking was done by an American engine with 53 in. spider and $2\frac{1}{2}$ to 3 in. tire, at intervals of 15 or 16 ft.—a sharp bend of about $\frac{3}{8}$ to $\frac{1}{2}$ in. inward, and $\frac{1}{4}$ in. downward on both sides. On reaching the division point the engineer reported the trouble, saying that the engine had been lurching and jumping very badly, etc. The engine was carefully looked over, and I may say we are still investigating the subject, but have not found out the cause. On the return trip a short piece of track was kinked to a less degree (by the same engine), and it was then decided to remove some of the counterbalance (supposedly it has always been insufficient), and there has been less trouble since with the engine's jumping, and as far as I know no track has been spoiled."

"In the first case the injury was done when the engine was shut off and running down hill, the second when the engine was working steam, on a level."

The cold-hearted sentiment, "The public be damned," which is popularly attributed to a railroad source, is now matched by the less vindictive but equally unfeeling utterance of a traffic man in Iowa, as reported by one of the Railroad Commissioners of that state. The owner of a mill appealed to the railroad for reduction in rates, alleging competition at larger shipping points, and averring that if relief were not forthcoming he "could not live." "You don't have to live," was the prompt reply of the G. F. A. The stern logic of events is constantly forcing this truth on one or another of us, but to learn it from a railroad officer is indeed cruel. This officer must be a relative of the minister who was appealed to by the shiftless applicant for work (?) with a similar argument. "I must live," said the believer in the law that the world desires our company badly enough to pay something for it. "That does not by any means follow," said the ready parson.

It has been rumored at various times that the Grant Locomotive Works of Paterson are to be closed. It is said authoritatively that the company intends to remove its works to some point in the West not yet determined upon, and in view of this the force of workmen was lately reduced, but heavy orders have compelled the re-employment of as many of the old hands as could be secured, and the works are now in full operation and have orders that will keep the present force at work for six months to come. It is further said that nothing is more remote from the plans of the company than a retirement from business, but that, on the contrary, its plant will be increased and will be made one of the most complete in the country when the company is established in its new location.

The Pacific Railroads Committee of the Senate has made a report unanimously recommending the passage of the Outhwaite refunding bill without amendment. The report deals only with the Union Pacific and Central Branch, recognizing that these companies are better able and more willing than the others to settle with the Government. In this, as in all essential particulars, the report agrees with the recommendations of the special commission which reported to the President a few months ago. Observers at Washington say that the Outhwaite bill is now very likely to pass both houses this session.

As the railroad system grows in Mexico the question of government regulation comes up there as well as elsewhere. The department of public works has been for some time studying the subject of rates, and it is rumored that the government will take steps to compel the roads to carry domestic freight for rates as low as or lower than those made for foreign freight. The object of course is the same as that which the lower legislators and commissioners have tried to accomplish,—the protection of local interests against outside competition.

General Manager A. N. Towne, of the Southern Pacific, has offered to carry unemployed young persons from San

Francisco to the fruit raising districts of California at one fourth fare. This strikes one as an uncommonly comprehensive way of doing good. The children are helped to help themselves to money and health, the fruit growers are helped to gather their crops and the railroad company, if it makes no money in carrying the passengers at the very low fare, will doubtless get some benefit from the greater crop of fruit gathered.

Low rates on lumber by the new Texas line have induced Denver dealers to overstock, and one dealer is said to have laid in a trifle of 187 car-loads more than he can find room for. Perhaps this 3,000 tons of lumber can be taken as one of the straws showing the cause of the downfall of the Denver demurrage bureau.

NEW PUBLICATIONS.

The Official Guide to the London & Northwestern Railway is a neat and useful little book, which contains numerous maps and illustrations, and is, indeed, an excellent guide-book through the large part of England and Wales which is served by the London & Northwestern. While it lacks the ornamental appearance and handsome binding, cream colored paper, etc., of the various similar publications here—"Picturesque Erie," etc.—it is a volume containing a good deal of solid information as to the history of the railroad and the towns, castles, cathedrals, etc., near which it passes.

The London & Northwestern Time-Table comprises nearly 140 pages and a large supplement giving fares and regulations for tourist's tickets which are only issued during the summer months. The book is larger than our *Official Guide*, but it is only about one-quarter as thick, and is sold at the surprising low price of 2 cents. It is issued on the first of every month, at which date, and no other, are any changes made in the running of trains. On the cover is a small map of the railroad system which it represents. Inside the cover is an index. Next follow notices of new and important train services, then follows a page giving particulars as to the facilities for American passengers, and then follow notices of all the changes in the train service for that particular month. Then follows a list of all the express trains running from London during the month of July, 32 on week days and 9 on Sunday. The maps and tables throughout contain references to the page on which the times of the connecting trains are given, and this would certainly appear to be more convenient than a reference to the name of a particular railroad or branch. After the time-tables proper, the train service connecting distant points (only part of which is worked by the London & Northwestern) are given. Then follow steamer arrangements, apparently over all parts of the world, then tables of fares to the principal points, and general notices as to the manner in which invalid carriages can be obtained, the charges for luncheon baskets, 60 cents without beer or wine and 75 cents with. Then follows a list of the freight agents and principal points for shipping and receiving freight and express packages, which are conveyed by the road without any intermediary, and the rules and regulations for the conveyance by passenger train of "small birds alive," boats or canoes, "dog secured by chain and collar only," and even "live deer." Then follow hotel advertisements, cab fares, particulars of stage and carriage accommodations at country stations, insurance, regulations as to return and contract tickets, the official telegraphic address of the principal officers, a complete list of stations, 11 maps printed in colors, and on the back are vignettes of the 10 hotels owned and managed by the company at their principal stations.

The manner in which the advantages of this particular route is set forth is simple. All references to steel rails, stone ballast, magnificent palace cars, etc., are omitted, and it is simply said that the London & Northwestern runs to and-so in so many hours, adding at the foot, it is to be presumed as a concession to American patrons, "Sleeping saloons on the night trains."

Heating Cars by Steam from the Locomotive.—The report on this subject made by Professor Lanza to the Massachusetts Railroad Commissioners has been published in a pamphlet form, with illustrations of the apparatus employed in testing the amount of steam consumed, etc. The Professor records the results of his investigation of the working of different systems of continuous heating on the Boston & Albany, seven other New England roads, and the Atchison, Topeka & Santa Fe. The results of these investigations are very fully and frankly given. The Professor shows no desire to view the question through rose-colored spectacles, for the shortcomings of couplings, traps and regulating valves are very clearly indicated, and his criticisms in some cases do not appear to err on the side of leniency. The conclusions at which the Professor arrives are as follows:

"It is very important that there should be uniformity in couplers. The Westinghouse air-brake $1\frac{1}{2}$ in. coupling, with a hard rubber gasket, works satisfactorily, railroad employes are familiar with its use, and the patent upon it expires shortly.

"In regard to everything else, uniformity is not so imperative.

"The main pipe should be as well protected as possible. If it must be outside the car it should be thoroughly wrapped. A better place for it is between the sills, and in that place, also, it should be wrapped, or it may be placed inside the car, as is done to some extent by Mr. Richards, of the Boston & Providence, and by Mr. Henney, of the New York & New England.

"The main pipe, the valves connecting this with the radi-

ating pipes, and the entire system of radiating pipes should be such as to offer the least possible resistance to the flow of the steam, so that high steam pressure shall not be required on the train. A 2-in. or at least a 1½ in. pipe is desirable to meet this requirement.

"A reducing valve which is not liable to get out of order and let high pressure on the cars is a great desideratum.

"The amount of radiating surface generally adopted, and which seems to be sufficient, is about 1 sq. ft. for each 25 cub. ft. capacity of car.

"The trap should be protected from freezing, and the best way is to have it inside the car. The trap introduced by Mr. George A. Houston on the Atchison, Topeka & Santa Fe is recommended for examination and trial.

"It seems probable that auxiliary boilers under the cars can be dispensed with in this state.

"Stations where cars are left should generally be provided with a stationary boiler and pipes for heating the cars.

"The amount of steam required is neither excessive nor inappreciable. Nevertheless, the question of economy will be an important element in deciding upon the nature of the appliances to be used when it is desired to heat trains of ten and twelve cars. As a rule the time when the most steam is needed for heating is the very time when travel is the lightest and hence when the steam can best be spared.

"It is desirable that there should be some automatic device for regulating the heat."

TECHNICAL.

Locomotive Building.

The Brooks Locomotive Works, of Dunkirk, N. Y., have just completed a 45-ton passenger locomotive for the Lake Shore & Michigan Southern. The cylinders are 18x24, and the drivers 68 in. in diameter. The tank holds 3,600 gallons. The locomotive has an extension front.

The Manchester Locomotive Co., of Manchester, N. H., has completed two American locomotives for the New York, Providence & Boston. The Eames vacuum brake and the Ross-Meehan brake shoe are used. The Krupp tire is also used on the tender wheels.

The Rogers Locomotive Works, Paterson, N. J., this week shipped two new passenger locomotives to the Louisville & Nashville.

The Western New York & Pennsylvania has just completed a new locomotive at its shops at Olean, N. Y., under the supervision of Master Mechanic C. E. Turner. This is said to be the first locomotive entirely built at these shops.

The Dickson Mfg. Co., of Scranton, Pa., has nearly completed two new locomotives for the Delaware, Lackawanna & Western. They have straight stacks and extension fronts.

Car Notes.

The Louisville & Nashville has recently completed 25 new cars at its Pensacola shops, and ten freight cars at the Birmingham shops.

The Litchfield Car Co., of Litchfield, Ill., has shipped another consignment of 50 platform cars to the Southern Dispatch Lumber Line.

The Barney & Smith Mfg. Co., of Dayton, Ohio, is shipping weekly consignments of freight cars to the Southern Pacific, on a large order from that road.

The West Shore has just received four new sleeping cars from the Buffalo shops of the Wagner Car Co., and the Delaware, Lackawanna & Western has just received two new sleeping cars from the Detroit shops of the Pullman Co.

The Ohio Falls Car Co., of Jeffersonville, Ind., completed this week two passenger cars for the New York & Greenwood Lake, finishing the order of 10 for that road.

Twenty-five new rapid transit coaches will soon be placed on the Atlantic Division of the Long Island road, replacing some of the old cars.

Bridge Notes.

The first engine crossed the Chicago, Burlington & Quincy bridge at Nebraska City, Neb., on July 27. A small viaduct remains to be completed between the river and the depot, but the bridge will be ready for regular trains within two weeks.

Mr. W. Hildenbrand, civil engineer, is superintending the work of inspection of the anchor bars and iron work of the suspension bridge at Allegheny, Pa. It is now about 30 years since the work was completed, and the inspection is made to determine if any disintegration or corrosion has occurred where the iron work is covered by masonry or otherwise.

The Buffalo, Rochester & Pittsburgh is laying the foundation for an iron and stone viaduct over the Erie tracks at Silver Lake Junction, N. Y. The viaduct will be 50 ft. high and will have seven spans. The Keystone Bridge Co. of Pittsburgh have the contract for the superstructure.

The Keystone Bridge Co., of Pittsburgh, Pa., is building a bridge over the Connecticut River for the Shore Line Division of the New York, New Haven & Hartford. This road has put in a number of new bridges this season, all of them, except the above, being of less than 150 ft. span.

The Canadian Pacific has erected the following bridges on the mountain section of the Western Division this year: An iron through truss over the fourth crossing of the Bow River near Kananaskis station, three spans each 156 ft. 6 in.; wooden Howe truss bridges over the fifth, sixth and seventh crossings of the Bow River and the first, second and third crossings of the Devil's Head Creek, all between Cammore and Banff stations; wooden Howe truss bridge over north arm of the Bow River near Laggan station; wooden Howe truss bridge over Blaeberly River east of Donald station. All the above bridges were put in to replace pile bridges.

O. C. Bell, County Clerk, Lincoln, Neb., will receive bids until Aug. 20, for erecting two iron bridges with 60 and 80 ft. spans, bidders to submit plans and specifications. Bids for six wooden and two combination bridges are also asked.

O. F. Serviss, County Auditor, Springfield, O., will receive bids until Aug. 20 for erecting an iron or steel bridge near Medway, with a clear span of 152 ft. Bidders to furnish plans and specifications.

The Merchants' Terminal Bridge scheme, which was defeated about a year ago by Jay Gould, has been revived, and it is stated that some progress has been made in floating the stock. The plan is to build a bridge in North St. Louis, across the Mississippi River, to give terminal facilities to several additional railroads now seeking an entrance to the city. A charter for the new bridge was obtained two years ago from Congress, and the city has given all the necessary right of way. John D. Ferry, Maj. C. C. Rainwater and others are interested in the scheme.

The first bridge with steel and iron draw span built for railroad use on the Pacific coast is that erected by the California Bridge Co., of Oakland, Cal., for the San Francisco & North Pacific, over Petaluma Creek, on the new Napa & Marin line. The bridge is 3,100 ft. long, the drawbridge of

steel and iron being 226 ft. long, allowing two openings of 100 ft. The remainder is wooden trestle work. The bridge was built under the supervision of F. K. Zook, Chief Engineer of the San Francisco & North Pacific.

The New York Central & Hudson River has awarded the following contracts to the Union Bridge Co.: Bridge over 4 tracks at 158th street, New York, 70 tons of open-hearth steel; also over 4 tracks at 161st street, New York, 85 tons of open-hearth steel. The Hilton Bridge Co., of Albany, N. Y., has the contract for about 1,200 tons of iron for bridge repairs.

The following proposals for the construction of a wrought-iron bridge over the Lehigh River have been received by the Commissioners of Northampton County, Easton, Pa.: King Iron Bridge & Mfg. Co., Cleveland, O., \$22,000; Mt. Vernon Bridge Co., Mt. Vernon, O., \$22,900; Smith Bridge Co., Toledo, O., \$24,300; Groton Bridge Co., Groton, N. Y., \$24,960; Dean & Westbrook, New York, \$27,800; Massillon Bridge Co., Massillon, O., \$28,000; New Jersey Steel & Iron Co., Trenton, N. J., \$29,100; Pittsburgh Bridge Co., Pittsburgh, Pa., \$28,860, \$31,850 and \$35,800. The contract was awarded to the King Iron Bridge & Mfg. Co.

The Shiffer Bridge Works, of Pittsburgh, Pa., have contracts for erecting bridges over the following railroads: Baltimore & Ohio, Pennsylvania, Pennsylvania Company, East Tennessee, Virginia & Georgia, Kanawha & Ohio, Chattanooga, Rome & Columbus, and Oxford & Clarksville.

Last February Ohio County, West Va. (which includes Wheeling), voted to take \$300,000 of the stock of the company which controls the franchise for a bridge across the Ohio, at Wheeling, conditional upon the construction of the bridge and upon the expenditure of \$300,000 on terminals within the city limits. The company is a West Virginia corporation known as the Wheeling & Harrisburg Railroad Co.

Manufacturing and Business.

George R. Menely and T. Getman have dissolved the co-partnership heretofore existing, and constituting the firm of George R. Menely & Co., Manufacturers of journal bearings and other railroad supplies, at West Troy, N. Y., and Atlanta, Ga., and a new firm has been formed by George R. Menely and Charles D. Menely, who will continue the business as George R. Menely & Son.

The Erie has had two cars running on the night express through from Jersey City to Buffalo fitted with the Camille Faure system of storing electricity, which is being tested by the Electric Accumulator Co. of New York. Six crates of 23 candle battery, each 16 in. square, and containing a layer of 12 negative and 11 positive plates, are used, and four hours is occupied in charging them sufficiently to give light during the 18 hours it takes to make the round trip.

The Waterhouse Manufacturing Co., of Hartford, Conn., is placing 135 arc lights in the factory of the Whittin Machine Co., Whitesville, Mass. This is the second order from that company.

The Springfield Glue & Emery Wheel Co., of Springfield, Mass., has placed a large emery surface planer in the works of the Mason Machine Co., of Taunton, Mass. It is 18 ft. long and weighs 8 tons. It is thought to be the largest machine of the kind ever made in this country.

It is reported that all the standard gauge cars now being built for the Cleveland & Canton will be equipped with the Martin car heater.

The contracting firm of Thomas Earle & Co., of Vancouver, B. C., has been dissolved, and a new firm has been formed under the name of Earle & MacLeod.

The Railway Electric Car Lighting & Signal Co. has filed charter in Newark, N. J., to supply electric light, signals, switches, switch towers and other electric apparatus to railroads. The company will commence business with \$1,000. The incorporators are: William Brackin, New York; Henry G. Morris, Philadelphia, and Henry Weston, New Brunswick.

The New York Iron Roofing & Corrugating Co. report large sales for the past month in the New England and Middle states, also in Canada and Mexico. Owing to the continued increased demand for their products, they have been obliged to add considerable new machinery, by which their capacity has been increased about one-half.

The firm of Rosewater & Christie, of Omaha, Neb., has been dissolved. Andrew Rosewater, the senior member, will continue the business; and G. B. Christie, the retiring member, will form a contracting firm with Jesse Lowe.

The Texas & Pacific has ordered a large number of Sheffield paper-wheel hand cars.

The publisher of *The Australian Ironmonger* will make a tour through the United States, from San Francisco to New York, in the autumn. He will be glad to call on American firms en route who may wish to talk with him concerning business in the Australian Colonies.

Iron and Steel.

The Southwark Foundry & Machine Co., of Philadelphia, Pa., is building two reversing Porter-Allen engines for Carnegie, Phipps & Co., and four duplex blowing engines for the new works of the Pennsylvania Steel Co., at Sparrow Point, Baltimore.

The Standard Steel Casting Co., of Thurlow, Pa., has been awarded the contract for furnishing 120 tons of steel castings for the battleship "Texas." The contract price was \$41,664.

The steel rail mill of the Pottstown Iron Co., at Pottstown, Pa., has been shut down for an indefinite period.

The plant of the Warren Tube Co., at Warren, Ohio, will be sold at auction on Aug. 14. Its appraised value is \$115,000.

The Chester Rolling Mill Co., of Thurlow, Pa., has contracted for the construction of a new Bessemer steel plant and blooming mill, with a weekly capacity of from 2,000 to 2,500 tons. The plant will be built by James Withrow & Co., mechanical engineers.

The Aluminum Brass & Bronze Co., of Waterbury, Conn., has decided to locate its works in Bridgeport, Conn. Bids and estimates on buildings, machinery, etc., are being received.

The two Cedar Point furnaces of the Baltimore Iron Co., at Baltimore, Md., have been dismantled and the wharf property has been sold to the Philadelphia, Wilmington & Baltimore Railroad.

The Sharon furnace, owned by Boyce, Rawle & Co., at Sharon, Pa., has been leased to J. J. Sparman, of Sharon, and Col. J. Collard, of Pittsburgh. It has been standing idle a year, but will be started at once.

The Big Timber Raft.

Some days ago two tugboats sailed from Boston, engaged to tow the great raft which has been built at Joggins, N. S. The raft consists of 22,000 sticks, varying in length from 20 to 50 ft., containing about 5,000,000 running feet of spruce spars. The structure is built around a great chain of 1½ in. iron. To this are connected cross chains, which run through the timbers at intervals, so arranged as to be tightened by the pull on the main chain, by which the raft will be towed. There are also wire ropes around the raft at intervals. The whole structure is 600 ft. long, 55 ft. beam and 37 ft. deep, and draws 21 ft. of water. It carries two masts for lanterns.

It is said that the attention of the Dominion Government

has not been officially directed to the possible dangers arising to commerce from this raft, but the Minister of Marine has stated that it is the intention of the government to consider whether any legislation is necessary to prevent such experiments. It is thought probable that the government will be guided largely by the experience with this raft in recommending or not any new laws to cover the case.

American Railway Master Mechanics' Association.

Below is a list of the committees appointed by President Satchel to carry on the work of investigation and other business during the current year. The various committees are urged to begin the work assigned them as early as possible, in order that valuable reports may be prepared in good season for the next convention. The first member named in each committee is chairman of the same.

ANGUS SINCLAIR, Secretary.

Purification, or Softening of Feed Water: Herbert Hackney, John Player, W. T. Small.

Tires. Advantage or otherwise of using thick tires: J. W. Stokes, C. E. Smart, Henry Schlacks.

Exhaust Pipes and Nozzles. Best form and size in proportion to cylinder: C. F. Thomas, A. W. Gibbs, Geo. D. Harris.

Driving and Engine Truck Boxes. Best form and material, including journal bearing and manner of fastening same in box: Wm. Buchanan, John W. Cloud, J. M. Boon.

Boiler Covering. Best method and material to prevent radiation of heat: G. W. Stevens, John Mackenzie, T. B. Twombly.

Driver Brakes: Best manner of applying, including best form and material for driving brake shoes: Charles Blackwell, H. D. Gordon, W. H. Thomas.

Best Proportion of Grate and Flue Area: J. Davis Barnett, G. W. Ettenger, Philip Wallis.

Foundation Ring for Boiler-leg. Best form, and advisability of double riveting: J. N. Lauder, W. J. Robertson, Harry Tandy.

Water Space Surrounding Fire-box. Is it usually large enough for free circulation? John Hickey, J. N. Barr, R. W. Bushnell.

Magnetic Influence of Iron and Steel in Locomotives on the Watches of Engine-Runners: T. W. Gentry, James Meehan, Harvey Middleton.

Paper to be read by Colman Sellers, Associate Member.

Obituary.—On Charles T. Parry: E. H. Williams, Isaac Dripps, H. D. Garrett.

On W. H. Morrow: W. L. Austin, L. M. Ames, L. B. Paxson.

On Robert Curtis: E. B. Wall, W. W. Reynolds, Leroy Kells.

On J. O. D. Lilly: Reuben Wells, Wm. Swanston, John McKenna.

The Emery Testing Machine in London.

The Yale & Towne Manufacturing Co. has established a temporary testing laboratory in London. They have erected there a 75-ton Emery testing machine, with the object of making known to English engineers the characteristic features of this machine. The machine will test specimens in tension from 12 in. up to 4 ft. 3 in. in length, round iron from ½ to 1½ in. in diameter and square iron from ¾ to 1½ in. It will take specimens for compression up to 7 ft. 1 in. in length, and for transverse tests not exceeding 5 ft. between bearings.

A New Southern Pacific Steamer.

Cramp & Sons of Philadelphia, have contracted with the Southern Pacific to build a new steamship for that company. It will be 338 ft. long, 42 ft. 8 in. beam and 31 ft. 8 in. depth of hold, with a gross tonnage of 3,531 tons. The steamer will have triple expansion engines and will be fitted with all improvements in ship building of the present time. This steamer will take the place of the "Eureka," which was lost early in the year.

The Rail Market.

Steel Rails.—Sales of about 10,000 tons have been made during the week by Eastern mills, principally for Southern delivery. Quotations are now \$29.50@29 at Eastern mills.

Old Rails.—A sale of 1,000 tons of tees is reported at a price said to be \$21 on cars.

Track Fastenings.—Quotations: spikes, 2.05c. delivered; angle bars, 1.90c. delivered.

The Vestibule Patent Suit.

In the United States Circuit Court at Chicago, Judge Blodgett presiding, the suit of the Pullman Palace Car Co. against the Wagner Palace Car Co. and the Lake Shore & Michigan Southern, to enjoin the use of vestibule cars, was called, and the defendants, giving bond with W. K. Vanderbilt and others as sureties as to the approval of the court to secure the Pullman Co. against damages, the order of injunction was set aside and dissolved, pending a final hearing, which will be in October next.

Machine for Planing Lagging.

A machine for concaving and convexing the 3-inch boards used for lagging on locomotives has been lately invented by Mr. J. H. Vreeland, Master Mechanic on the New York, Lake Erie & Western. The machine consists of a bench on which are placed under and over knives. The boards are run through the knives and come out in a few minutes ready for use. The work was formerly done by hand and the saving of time by employing power is considerable.

Wrist Pins and Crank Pins.

It is a difficult matter to draw the line between wrist and crank pins. Although the pins in the locomotive drivers are sometimes called wrist pins, we believe that the term crank-pins is the only correct term for these pins. The term "wrist-pin" is usually applied to cross-head pins. In a general way it may be said that crank pins have a complete motion of rotation, and wrist pins a motion of translation or rectilinear motion. In our opinion the term "crank-pin" should be applied to pins which connect the crank and connecting-rod in any engine, locomotive or otherwise; pins in the cross-head should be called cross-head pins; and the term "wrist-pin" should be applied to pins in other mechanism, which have rectilinear motion, or which describe arcs of circles, providing a more definite term cannot be found for them.—*American Machinist.*

Watch Inspection.

Messrs. Giles Bros. & Co., of Chicago, now hold the position of chief examiner on 14 different roads, including the Chicago & Northwestern; Wabash; Cincinnati, New Orleans & Texas Pacific; Chicago, Santa Fe & California; St. Louis & San Francisco; Wabash Western; Wichita & Western and Atlantic Coast Line. This firm sends standard time over all the circuits of the Chicago Telephone Co., every minute during the 24 hours.

A newspaper item says that as a result of the inspection recently adopted on the Columbus, Hocking Valley & Toledo, out of 157 watches 52 were rejected, leaving 105 approved. Of those whose time-pieces were rejected, 24 have

presented new ones, which have been approved. The percentage of rejection, this paper says, was good in comparison with the first examination on the Panhandle, when over one-half were rejected.

Pipes Supporting Brick Arch.

A correspondent of the *Locomotive Engineer* makes the following practical suggestion, which would be useful where bad water is used:

"I see a sketch in *Railroad Gazette*, June 29, of Mr. Lauder's plan of putting in pipes to support brick arch which is very good, but if the water should be in any way bad, a brass plug in the outside sheet, opposite the end of the pipe, would be valuable, as the plug could be taken out and a rod run through the arch pipe, cleaning it out every time the boiler was washed."

Mr. E. A. C. Du Plaine, proprietor of the Chicago Smelting and Refining Works, has erected new works at Chicago. Quite a variety of articles will be manufactured, embracing bronze or brass castings, phosphor-bronze, nickel-bronze, and United States standard gun metal work for machinery, rolling mills, Babbitt metal, and other articles for railroad use.

Besides contracts for various bridges the Shiffler Bridge Works, of Pittsburgh, have the contract for erecting the main building for Henry Diston & Co., at Philadelphia, Pa., which was recently destroyed by fire. The works are also to erect a steel rail mill for the Allegheny Bessemer Steel Co., at Duquesne, Pa.

THE SCRAP HEAP.

The Difficulties of a Western Brakeman.

A difficulty occurred on the morning of July 28, on board a passenger train of the Kansas City, Springfield & Memphis Railroad, near Hardy Station, Kan., 127 miles west of Memphis, between C. S. Burks, a brakeman, and some unruly passengers who were in the ladies' coach. A general fight ensued, and in the mêlée one of the men stabbed Burks with a knife near the heart, causing almost instant death. The murderer, together with two of his comrades, jumped from the train and made their escape into the woods. Burks was 20 years of age and lived at Springfield, Mo., where his remains were sent for interment.

It Should be Taken with Salt.

BIRMINGHAM, ALA.—A few mornings since engineer Stone was running a south-bound passenger train at the rate of forty miles an hour. When near Eutaw the engine struck a cow that chanced to be on the track. Instead of knocking the animal off the track she was run over and crushed to death under the wheels. Stone felt the engine jolt considerably when it ran over the cow, and on this account stopped the train. He found what the matter was, and continued the run to Meridian. When that place was reached the fireman made ready to clean out the ash-pan as is customary. The first thing that he found in the hot ashes was the dead cow's tongue, nicely cooked. The ashes were just warm enough to cook the meat well. It was taken out by the fireman, and he and Stone made an excellent breakfast out of it. —*Texas Live Stock Journal*.

Condensed Advice.

We advise the thousands of hard working, faithful and honest engineers in the Brotherhood, to drop their dynamic associates, change the name of their association, elect new officers, and then keep still for several years. This is the only way they can crawl back to where the once respected Brotherhood stood in the estimation of the public. —*Pathfinder Guide*.

The Brotherhood of Engineers.

At a meeting at St. Joseph, Mo., July 25, at which there were present 700 delegates from engineers', firemen's, and other organizations, claimed to be from all parts of the United States, several propositions (made it is said by Chairman Hoge) looking to some sort of compromise or surrender by the men engaged in the late Burlington strike were promptly voted down. It is said that the switchmen's and brakemen's brotherhoods were largely represented at this meeting and a coalition of these associations with those of the engineers and firemen was talked of.

At Aurora, Ill., July 25, Bowles, the arrested dynamiter, testified that, at a meeting of the Aurora Lodge of the brotherhood, in April, Bauereisen suggested to those assembled the advisability of using dynamite. Bowles went to Indiana under Bauereisen's instructions to purchase dynamite.

A Brakeman Stabbed.

Charles L. Burks, a brakeman on a Kansas City, Memphis & Birmingham passenger train, was stabbed and killed on his train near Hardy Station, 127 miles west of Memphis, on July 28. Five drunken persons boarded the train and indulged in boisterous behavior and vile language; Burks politely requested them to cease, but was insulted and attacked, and a general fight ensued, two passengers taking Burks' part. The chair-car porter saw the stabbing and stopped the train, whereupon the desperadoes escaped to the woods. Burks leaves a family at Springfield, Mo.

The Effects of Iowa Legislation.

Countryman (in front of Stock Exchange): "What's all that yellin' in there, Mister?"

Citizen: "Bad break among the 'grangers'; they're being knocked all to pieces."

Countryman (whipping off his coat): Whoop! lemme git in there, an' I'll do some paralyzin'. I'm a granger myself! —*The Epoch*.

Discharged for Drinking.

Eight conductors and trainmen on the Long Island Railroad were discharged last week for entering saloons and drinking intoxicants during their hours of duty. Pinkerton detectives watched the men and secured the evidence upon which they were discharged. The action of the road in dealing so summarily with the men has created a commotion among other employes.

Acoustic Engines.

Old lady—Do you actually mean it, Mr. Sharpley, that the boats from New York to Boston go by Sound?

Sharpley—Positive fact, madam, no question about it. Old lady—Goodness gracious, what a queer motive power. What will they do next? First they had sails, then steam, then electricity, and now it's sound. I just reckon it's one of that man Edison's inventions. —*The Ocean*. Probably the brass bands with which the passengers are entertained are run by the exhaust.

RAILROAD LAW—NOTES OF DECISIONS.

Powers, Liabilities and Regulation of Railroads.

In Utah it is held that a railroad corporation is a domestic corporation of a territory where it does business, though organized under the laws of the United States; and a writ of

garnishment served on it in the territory will operate to hold the debt attached, though it were contracted in another territory.¹

In Kentucky a designated portion of land had been ceded to a city for the use of a railroad company, on condition that no more land was to be taken for that purpose. Afterwards the company instituted proceedings, under the statute, to have additional lands condemned. The Court of Appeals rules that, while the right of eminent domain cannot be impaired by any private contract, the Court should prescribe such terms as would assure to the property owner a just compensation for the lands ceded under the contract.²

In Missouri the Supreme Court holds that a city empowered by its charter to grade its streets, cannot make such alterations in the grade as to injure private property, without making just compensation therefor, under the state constitution, providing that private property shall not be damaged for public use without just compensation, and where the city authorizes a railroad to do so, the latter also is liable in damages.³

In Arkansas the Federal Court holds that Congress cannot grant a right of way over the lands of the Cherokee Nation without its consent, on the ground that the United States has title to such land. If it can do so, it must be done because the government of the United States can exercise, with reference to the lands of the Cherokee Nation, the right of eminent domain.⁴

In Massachusetts the Supreme Judicial Court rules that railroad bonds are not "negotiable promissory notes" within the statutes of that state, and are therefore not entitled to days of grace; nor are interest warrants payable to bearer and detached from the bonds.⁵

In New Jersey it is held that neglect to keep a bridge in repair across a cut made by a railroad company, where its road crosses a public highway, so that travel is obstructed upon the highway, is a breach of duty to the public, for which the owners or operators of the railroad are indictable.⁶

Carriers of Goods and Injuries to Property.

In Pennsylvania the Supreme Court rules that a railroad is not required to pay the costs that have accrued, or enter into a recognizance for the payment thereof, upon its taking an appeal from the award of viewers assessing damages for land taken by the railroad company under the right of eminent domain.⁷

In the same state, the Court holds that an action for damages arising from the construction of a railroad may be brought as soon as the work which results in the injury complained of is undertaken, and the plaintiff may recover all damages which may be caused by the location and by the subsequent construction of the road.⁸

In the same state it is held that the advantages and disadvantages are to be estimated upon the farm or tract as a whole, and not upon each separate field as though it was a separate property. An advantage accruing to one farm or tract by reason of the construction of the railroad near or through it cannot be set off against an injury sustained by another piece of property belonging to the same owner. The owner of a farm or tract, part of which is benefited, and another part of which is injured, cannot divide his property arbitrarily so as to exclude from the consideration of the jury the advantages he secures in one place while recovering for the disadvantages suffered in another.⁹

In New Jersey the Supreme Court rules that a railroad is not responsible for the incidental damages occasioned to land abutting on or near to the track, the road being run, in all respects, with care and skill.¹⁰

Injuries to Passengers, Employees and Strangers.

In Pennsylvania there was an explosion on a ferry-boat, caused, it was thought, by dynamite brought on board by an unknown person. The plaintiff, a passenger, was injured. The Supreme Court reverses a verdict in favor of the defendant, holding that an explosion on a steamboat, by which a passenger is injured, raises, without more, a presumption of negligence, and throws on the carrier the burden of proving that negligence did not in fact exist.¹¹

In the same state it is held that when a brakeman knows that it is unsafe to couple a broken car in the ordinary manner, and yet persists in doing so and is killed, his representatives cannot recover against the railroad company operating the car.¹²

In Iowa a civil engineer was in the employ of a railroad company, and in charge of laying track on a new line of road. While passing over the road, on his way to the front of operations, the train was derailed and he was injured. The evidence showed that at the place of accident the road-bed was soft and spongy, with no ditches for the escape of the surface water, and that the train was running at a high rate of speed. The Supreme Court decides that plaintiff's right to recover for the negligence of defendant could not be defeated on the ground that he had assumed the risks and hazards of riding over a new track, contemplated in his employment to aid in the construction of the road.¹³

In Colorado an employe of a railroad was working in a narrow cut, and a car becoming detached from a train, ran through the cut, and he was injured either by jumping against the walls of the cut or by stones thrown from the car. The Supreme Court holds that this shows no negligence on the part of the railroad, and the plaintiff cannot recover damages.¹⁴

In Indiana it appeared that from the top of the rails to a bridge crossing a railroad track was only 15 ft. and 9 in. and the box cars upon which the brakeman was compelled to stand were 11 ft. in height; the finding of the jury was that the railroad company was guilty of negligence in both the building and maintenance of the bridge, and that previous to his injury the plaintiff did not know that his service as brakeman was a hazardous one by reason of the low bridge, and was not notified of that fact, nor of any fact connected with the bridge, and his want of such knowledge was not the result of his negligence; and he was injured while attending to his duty on a dark night, when he could not discover his proximity to the bridge and no danger signals were given. The Supreme Court refuses to set aside the verdict against the company.¹⁵

In Pennsylvania the Supreme Court holds that a railroad that contracts for the moving of its cars by horse power over its own track from one of its depots to the various consignees, is liable for injuries caused by the negligence of the contractor. The liability is none the less because the contractor employed the horses and men, and exercised an independent control over them.¹⁶

- ¹ *Loose v. Ream*, 17 Pac. Rep., 452.
- ² *Cornwall v. L. & N. R. Co.*, 7 S. W. Rep., 553.
- ³ *Sheehy v. K. C. R. Co.*, 7 S. W. Rep., 579.
- ⁴ *Cherokee Nation v. South. Kas. R. Co.*, 33 Fed. Rep., 900.
- ⁵ *Chaffee v. Middlesex R. Co.*, 6 New Eng. Rep., 29.
- ⁶ *N. Y. & S. L. R. Co. v. State*, 11 Cent. Rep., 555.
- ⁷ *Murray v. Penn. S. V. R. Co.*, 11 Cent. Rep., 671.
- ⁸ *O'Brien v. Penn. S. V. R. Co.*, 11 Cent. Rep., 679.
- ⁹ *Balt. & Phil. R. Co. v. Springer*, 11 Cent. Rep., 681.
- ¹⁰ *Beseman v. Penn. R. Co.*, 11 Cent. Rep., 563.
- ¹¹ *Spear v. Phila. Wilm. & Balt. R. Co.*, 11 Cent. Rep., 613.
- ¹² *Barkdoll v. Penn. R. Co.*, 11 Cent. Rep., 707.
- ¹³ *Meloy v. C. & N. W. R. Co.*, 37 N. W. Rep., 335.
- ¹⁴ *Murray v. D. & G. R. Co.*, 17 Pac. Rep., 484.
- ¹⁵ *L. N. A. & C. R. Co. v. Wright*, 13 West. Rep., 738.
- ¹⁶ *Phila. W. & Balt. R. Co. v. Hahn*, 11 Cent. Rep., 615.

General Railroad News.

MEETINGS AND ANNOUNCEMENTS.

Dividends.

Dividends on the capital stocks of railroad companies have been declared as follows:

Cincinnati, Sandusky & Cleveland, 5 per cent. upon the preferred and common stocks, payable Aug. 6.

Columbus, Springfield & Cincinnati, 5 per cent., payable Aug. 6.

Connecticut & Passumpsic, 2½ per cent. upon the preferred stock, payable Aug. 1.

Flint & Pere Marquette, 3½ per cent. upon the preferred stock, payable Aug. 1.

Illinois Central, 3½ per cent., payable Sept. 1.

Kansas City, St. Louis & Chicago, 1½ per cent. quarterly upon the preferred stock, payable Aug. 1.

Louisiana & Missouri River, 3½ per cent. upon the preferred stock, payable Aug. 1.

Louisville & Nashville, 3 per cent., payable in stock, Sept. 3, to stockholders of record, Aug. 13.

New York Providence & Boston, 2½ per cent. quarterly, payable Aug. 10.

Meetings.

Meetings of the stockholders of railroad companies will be held as follows:

Alabama Great Southern, special meeting, Birmingham, Ala., Aug. 6.

Atlanta & Florida, annual meeting, Atlanta, Ga., Aug. 8.

Atlanta & West Point, annual meeting, Atlanta, Ga., Aug. 5.

Boston, Hoosac Tunnel & Western, annual meeting, Saratoga Springs, N. Y., Aug. 15.

Troy, Saratoga & Northern, annual meeting, Saratoga Springs, N. Y., Aug. 15.

Western & Atlantic, annual meeting, Atlanta, Ga., Aug. 5.

Railroad and Technical Conventions.

Meetings and conventions of railroad associations and technical societies will be held as follows:

The *Roadmasters' Association of America* will hold its next convention at Washington, D. C., Sept. 11.

The *New England Roadmasters' Association* will hold its sixth annual convention at Boston, Mass., Aug. 15-16.

The *National Association of General Passenger and Ticket Agents* will hold its fall meeting in Saratoga, N. Y., Sept. 18.

The *American Society of Mechanical Engineers* will hold its eighteenth convention and ninth annual meeting in Scranton, Pa., beginning Monday evening, Oct. 15.

The *Claim Agents' Association* will hold its annual fall meeting at the International Hotel, Niagara Falls, N. Y., on Thursday, Aug. 2.

The *Association of North American Railroad Superintendents* will hold its next meeting at the Southern Hotel, St. Louis, beginning Sept. 19.

The *Master Car and Locomotive Painters' Association* will hold its nineteenth annual convention in Cleveland, O., commencing Sept. 12, at 10 o'clock a. m.

The *American Association for the Advancement of Science* will hold its thirty-seventh meeting in Cleveland, O., Aug. 15 to 21. The headquarters will be at the Hollenden Hotel.

The *American Association of Railway Chemists* will hold its next meeting in Baltimore, Md., in October.

The *New England Railroad Club* meets at its rooms in the Boston & Albany passenger station, Boston, on the second Wednesday of each month.

The *New York Railroad Club* meets at its rooms, 113 Liberty street, New York City, on the third Thursday of each month.

The *Western Railway Club* will hold its next meeting on the third Wednesday in September, at the Grand Pacific Hotel in Chicago.

The *Central Railway Club* meets at the Tift House, Buffalo, the fourth Wednesday of January, March, May, August and October.

The *American Society of Civil Engineers* holds its regular meetings on the first and third Wednesday in each month at the House of the Society, 127 East Twenty-third street, New York.

The *Boston Society of Civil Engineers* holds its next regular meetings at its rooms in the Boston & Albany station, Boston, at 7:30 p. m. on the third Wednesday of September.

The *Western Society of Engineers* holds its regular meetings at its hall, No. 15 Washington street, Chicago, at 7:30 p. m., on the first Tuesday of each month.

The *Engineers' Club of Philadelphia* will hold its next meeting in Philadelphia, Oct. 6.

The *Engineers' Society of Western Pennsylvania* will hold its next meeting at Pittsburgh, Sept. 18.

The *Engineers' Club of Kansas City* will hold its next regular meeting Sept. 3.

Master Car and Locomotive Painters' Association of the United States and Canada.

The Secretary has issued the following:

SECRETARY'S OFFICE,
KENT, O., July 20, 1888.

The Nineteenth Annual Meeting of the Master Car and Locomotive Painters' Association will be held in Cleveland, Ohio, on Wednesday, Sept. 12, 1888, opening at 10 o'clock a. m. The Committee of Arrangements have secured special hotel rates at the "Hollenden," which will be the headquarters of the Association. The rates for board and rooms will be a uniform price of \$2.50 per day where two persons occupy one room, and \$3 per day for one person. Rooms can be engaged one week previous to the opening of the convention by addressing C. D. Collins, Manager of the "Hollenden," Cleveland, Ohio.

A general invitation is given to foreman car and locomotive painters throughout the United States and Canada to be present at the convention. At these annual meetings every opportunity is given to discuss the methods employed and to show the difficulties which we often experience, but by this interchange of opinions the most approved methods are reached, thus securing beauty, durability and economy in the painting of cars and locomotives.

The following programme of subjects has been chosen for discussion, and committees will be fully prepared to report on the questions assigned them. Those unable to be in attendance at the convention are requested to forward their report to the Secretary five days previous:

The Best Filter for the Inside Finish of Passenger Cars, and how it should be made and applied. E. A. Cole (New

York, Chicago & St. Louis, Chicago, Ill.; Wm. Lewis (Grand Trunk), London, Ont.

Is it Practicable to Oil and Varnish Passenger Cars on the Outside on the Natural Wood, such as Mahogany, Cherry, Red Wood, Pine, etc., and not Paint Them? E. E. Hartshorn (Maine Central), Waterville, Me.; R. W. Scott (Delaware Car Works), Wilmington, Del.; A. C. Sensenbach (St. Charles Car Works), St. Charles, Mo.

The Apprenticeship System in the Car Paint Shop. F. S. Ball (Pennsylvania), Altoona, Pa.

What Constitutes the Best Paint for Tin Roofs to Prevent Rust and Protect them from Cinders; Does it Save the Tin to Paint the Under Side before Laying? Frank Fisk (Scioto Valley), Portsmouth, O.; F. W. Horn (New York, Pennsylvania & Ohio), Cleveland, O.; W. R. McMasters (Wabash, St. Louis & Pacific), Decatur, Ill.

What Constitutes the Finest and Most Durable Body of Paint ready for Finishing Color we can get on Passenger and Baggage Cars in the Shortest Time? J. T. Cockburn (Cincinnati, Indianapolis, St. Louis & Chicago), Cincinnati, O.; M. L. Sims (East Tennessee, Virginia & Georgia), Atlanta, Ga.; A. Latsch (Illinois Central), McComb, Miss.

Is it Advisable to Wet Nail Holes before Putting in? On What Coat is it Best to Putty, and How Should Putty be Made for Coach Work? E. E. Earl (Northern Pacific), St. Paul, Minn.; E. J. Aubrey (Chicago & West Michigan), Muskegon, Mich.; C. C. Young (Chicago, Rock Island & Pacific), Trenton, Mo.

The Best System of Cleaning Passenger Cars Preparatory to Touching Up and Re-varnishing. James Looker (Wabash, St. Louis & Pacific), Toledo, O.; A. R. Given (West Shore), Frankfort, N. Y.

Queries.—1. What is the Best Formula for Preparing a Gold Size for Gilding on Passenger Cars? 2. How do you Make Your Packing for Steam Joints? 3. What Plan do You Pursue in Re-moving Old, Cracked and Scaled Paint from Tin? 4. How Should Glass be Set in Head Lights? 5. What is the Best and Quickest Method of Cleaning Glass in Coaches? ROBERT McKEON, Secretary.

SAMUEL BROWN, President.

American Society of Mechanical Engineers.

The following circular is issued by the Secretary. The Secretary makes the following announcement for the XVIIIth Convention of the Society, which will also be the Ninth Annual Meeting. The Council have accepted the most cordial invitation of the Board of Trade of the City of Scranton, Pa., to hold its meeting in that city, beginning Monday Evening, Oct. 15, and a later circular will give the details of sessions, excursions, etc.

The meeting comes somewhat earlier this year than usual, in order that the hill country of Pennsylvania may be enjoyed to the best advantage, and the meeting has been assigned, under the rules, for this date, with that object in view.

The society has so generally endorsed the plan of having all its papers in print and distributed in advance to those who expect to attend the meeting, that the attention of those who intend to be authors at this coming meeting, is especially drawn to the necessity of having their papers, with illustrations, etc., complete, in the hands of the Publication Committee not later than Aug. 20, 1888.

The Secretary would solicit papers giving short accounts of engineering experiences, and also papers for the economic section of the society's work on topics related to shop orders, methods of accounting, of superintendence and management, and particularly of ascertaining cost of work.

The society's system of presenting and discussing papers enables it to handle exhaustively a large number of papers at a convention, and the privilege and duty of contributing in this way to the society's work is urged on every one, even if he cannot expect to attend the meeting in person.

Applications to take effect before the fall meeting must be in the secretary's hands on or before Sept. 15.

Association of American Railway Accounting Officers.

In our issue of last week we gave some account of the first day's session of the convention of this Association.

The second and final session was held at the Hotel Brunswick, New York, July 26.

The following officers were elected: President, M. M. Kirkman, Comptroller Chicago & Northwestern; First Vice-President, M. Reibenack, Assistant Comptroller Pennsylvania R. R.; Second Vice-President, George L. Lansing, Secretary and Comptroller Southern Pacific; Secretary, C. M. Phillips, Chicago & Northwestern. Executive Committee: J. P. Whitehead, Comptroller Atchison, Topeka & Santa Fe; Cushman Quarrier, Comptroller Louisville & Nashville; S. M. Williams, Comptroller Central of New Jersey; D. A. Waterman, Auditor Michigan Central; C. G. Warner, General Auditor Missouri Pacific; George Little, Auditor Pullman's Palace Car Co.; C. Kelsey, Auditor Chicago & Alton, and S. B. Wiley, Comptroller and Secretary Oregon Railway & Navigation Co.

The following papers were read: Joint Through Freight Accounts, by T. J. Hyman, Auditor, Wisconsin Central; The Accounting Department as a Factor in the Management of Railroads, by S. M. Williams; Settlement at Junction Points of the Charges on Prepaid Shipments Way-Billed via Fast Freight Lines, and upon which Bills a Division of Revenue is Stated, by J. P. Curry, Auditor, New York, Chicago & St. Louis; Coupon Accounts, by M. Reibenack.

The suggestions and recommendations contained in these addresses were referred to the Executive Committee, and will, at a future meeting, come before the Association for definite action. In the meantime, the addresses will be printed in the report of the proceedings and circulated among all interested.

More than 100 roads are already represented in the Association. Applications for membership from those eligible should be sent to the secretary.

The next meeting of the Association will be held at Niagara Falls, the fourth Wednesday in July, 1889.

The New England Road-Masters' Association.

The sixth annual meeting of this Association will be held at the United States Hotel, Boston, Mass., Aug. 15 and 16, 1888. Meeting will be called at 1:30 p. m., Aug. 15, and with proper intermissions there will be work done until adjournment on evening of Aug. 16.

After the regular annual business of the Association, viz., reading of the minutes of last meeting, enrollment of new members, reading communications, election of officers, report of committees, unfinished and miscellaneous business, there will be discussed the following questions:

"Highway Crossings."—Best form for flangeway and economy of maintenance; carpenters or trackmen to do the work on same.

"Steel Rail."—Weight, section, inspection before acceptance, unloading from cars, shall it be curved before laying on curve? If to be curved, how shall it be done? Shall it be broken or square joint, supported or suspended at the joint?

"Necessary Monthly or Weekly Forms for the Rendering of Material Used and Classification of Labor Performed."—Are the use of same understood and give the results desired?

"The Maintenance of the Road Bed Outside of the Rails."—Proper time to mow and burn the brush and weeds, the most economical way to dispose of old ties, care of station

grounds, general care of section as regards its looks without much loss of time of trackmen.

"Nut Locks."—The best in use and does it pay to use them?

"Road Tools."—Improvement of same and value of such over former tools in use?

Review of questions discussed at previous years' meetings. There have been committees appointed on each question, who will report on same as each question is opened for discussion.

Association of North American Railroad Superintendents.

The next meeting of this Association will be held at the Southern Hotel, St. Louis, beginning on Wednesday, Sept. 19, at 11 o'clock a. m.

American Institute of Mining Engineers.

The fifty-second meeting of the Institute will be held at Buffalo, N. Y., beginning on Tuesday evening, Oct. 2, 1888. Further particulars will be given in a later circular. Members proposing to present papers at this meeting should notify the secretary as early as possible, stating the nature of the proposed papers.

R. W. RAYMOND, Secretary.

PERSONAL.

—Chief Engineer A. J. Kenyon, of the United States Navy, died at Oswego, N. Y., on July 27.

—Mr. J. R. Shaler, General Superintendent of the New York, Pennsylvania & Ohio, has resigned, and the office has been abolished.

—Major J. F. O'Brien, for the last two years superintendent of the Mahoning Division of the New York, Pennsylvania & Ohio, has resigned, and it is stated will accept an important position on a Mexican road.

—Mr. Ezra Osbourne died at Paterson, N. J., July 24, aged 75 years. He removed from Boston to Paterson in 1852, and was for many years Master Mechanic of the New York, Lake Erie & Western. He was highly esteemed by a large circle of friends.

—Mr. Frank M. Wilder, late general manager of the Safety Heating & Lighting Co., of New York, has been appointed Assistant to the President of the United States Rolling Stock Company, with headquarters at New York. Mr. Wilder will have the general supervision of all the shops of the company, and the construction work carried on in them.

—Mr. J. H. Setchel, President of the Railway Master Mechanics' Association, has resigned the position of Superintendent of the Brooks Locomotive Works. Mr. Setchel was for many years master mechanic of the Little Miami, and afterwards General Master Mechanic of the Ohio & Mississippi, which he left to take charge of the Brooks Locomotive Works.

—Christopher Meyer, director in several railroads, and prominently connected with several commercial firms, died in New York, July 31, after a short illness. He was one of the projectors of the Painesville & Youngstown Railroad, now the Pittsburgh & Western. In recent years he has been one of the largest stockholders in the Cincinnati, Hamilton & Dayton. His fortune is estimated to amount to \$6,000,000.

—Dr. H. C. Potter, who for 30 years has been associated with the Flint & Pere Marquette, and for a long time has been Vice-President and General Manager, has tendered his resignation, and it has been reluctantly accepted. He will soon start for Europe. Dr. Potter entered railroad service on the Flint & Pere Marquette in 1872, and has served successively as superintendent, secretary, treasurer, general manager, and since 1880 has also been vice-president.

—Mr. John J. Hunt, Car Distributor of the Grand Trunk, and Vice-President of the International Association of Car Accountants, died suddenly at his home in St. Lambert, Canada, on the afternoon of July 19, of syncope of the heart, leaving a wife and 11 children. Mr. Hunt was born in 1841, in the parish of St. Paul, county of Cork, Ireland, and came to America in 1861. He entered the service of the Grand Trunk in 1866, and has been Car Distributor of that company during the last 14 years.

—General Manager Belknap, of the Central of Georgia, has sent a party of his subordinates on a tour of inspection of various other roads. They will visit Louisville, Cincinnati, Pittsburgh, Philadelphia, New York, Roanoke, Richmond, and Norfolk, and will be gone from home several weeks. The party consists of the following gentlemen: E. E. Anderson, Train Master South Carolina division; F. H. McGee, Assistant General Master Mechanic; Mr. Martin, Superintendent Southwestern Division; G. D. Smith, Conductor, and W. H. Lathrop, Engineer Southwestern Division; James Stevens, Superintendent; G. D. Eldridge, Civil Engineer; W. D. Staub, Assistant Master Mechanic South Carolina Division, and F. D. Arden, Engineer. This is a sensible idea, and one deserving of imitation.

—Col. James N. Smith, a member of the well-known contracting firm of Smith & Ripley, died at his summer home at Litchfield, Conn., on Aug. 1, aged 54 years, from a fever contracted about six months ago, while engaged on a railroad in Florida.

Among the railroads in the construction of which Col. Smith was concerned were the "Nickel Plate," the Delaware, Lackawanna & Western, the Union Pacific (of which he built a section as the partner of Sidney Dillon, his brother-in-law), the Brooklyn, Flatbush & Coney Island, the Fourth avenue tunnel of the New York Central & Hudson River, St. Johns & Indian River, and the Atlantic Coast Line in Georgia and Florida. He was also a member of a syndicate which had undertaken considerable railroad building in Canada.

He was a brave soldier and served gallantly during the war as a captain in an Ohio regiment. Upon leaving the army he became a resident of Brooklyn, N. Y.

—Mr. P. D. Cooper, formerly General Manager of the New York, Pennsylvania & Ohio, died suddenly at the residence of his son, in Elkhart, Ind., on July 25. He became connected with the Lake Shore & Michigan Southern in 1857 as a station agent. While there Mr. Charles Paine gave him a position as rodman for a surveying party. From this position he steadily advanced, and was successively appointed Superintendent of the Detroit division, the Kalamazoo division, and the Toledo division, and later became Assistant General Superintendent. In 1873, when General Manager Devereux was appointed Vice-President and General Manager of the Atlantic & Great Western, now the N. Y., P. & O., he was appointed Mr. Cooper General Superintendent of the road. Later he became General Manager of the road, and held that position until ill health compelled him to retire from active service in October, 1882.

He traveled a great deal, hoping to regain his health, but

he had never recovered, although he had improved, and his death was unexpected. He was for several years President of the General Time Convention, and was widely known among railroad managers. Under his management the New York, Pennsylvania & Ohio was the first road to use the speed recorder. Mr. Cooper leaves a wife and two children. His son, Charles P. Cooper, is employed in the Lake Shore & Michigan Southern shops, at Elkhart, Ind.

ELECTIONS AND APPOINTMENTS.

Atchison, Topeka & Santa Fe.—W. L. Malcolm, General Eastern Agent at New York, has been granted leave of absence, and Charles D. Simonson, Assistant General Eastern Agent, has assumed the duties of the position.

Brookfield.—The following officers have been elected: William Stanbro, of Brookfield, N. Y., President; H. L. Spooner, General Manager; Walter F. Randall, of Oneida, Chief Engineer, and M. L. Brown, of Brookfield, N. Y., Secretary.

Buena Vista & Ellaville.—The annual meeting was held in Buena Vista, Ga., July 27, and the old board of directors was re-elected. W. B. Harrold was elected President and M. S. Belknap, General Manager.

California Southern and California Central.—The following circular has been issued by General Manager McCool. Mr. Herman Silver has been elected Treasurer, with office at Los Angeles, in place of G. L. Goodwin, resigned. All reports heretofore addressed to G. L. Goodwin, Boston, or to F. H. Pattee, Assistant Treasurer, National City, should hereafter be addressed to Mr. Silver. Mr. F. H. Pattee has resigned the office of Assistant Treasurer of the California Southern, but still retains that of Assistant Secretary of that company, and has been elected Assistant Secretary of the California Central. He has also been appointed Tax Commissioner of both roads. All communications relating to taxes of these companies should be addressed to him at National City, Cal.

The office of H. C. Whitehead, Auditor of both companies, is transferred from San Bernardino to Los Angeles, where all communications to him should be addressed.

S. C. Anable is appointed Car Accountant of both companies, with office at San Bernardino, Cal. All reports and communications relating to mileage or movement of cars heretofore addressed to the Auditor, should, hereafter, be addressed to the Car Accountant.

The office of the General Manager has been transferred from San Bernardino to Los Angeles.

Chicago, Milwaukee & St. Paul.—A. J. Earling has been appointed General Superintendent. Assistant General Superintendent, W. G. Collins, in addition to his charge of the Middle District, will assist the General Superintendent in general affairs and will have his office with him. J. B. Moll has been appointed General Road Master, with office at Milwaukee. The Iowa & Dakota Division has been transferred from the Middle District to the Northern District, and will be under the jurisdiction of Assistant-General Superintendent Case. Superintendent C. A. Cosgrave has been assigned to the Iowa & Dakota Division, vice J. B. Moll, transferred to general duties. Assistant Superintendent W. W. Collins has been appointed Superintendent, and assigned to the Prairie du Chien and Mineral Point Divisions, with office at Milwaukee. Assistant Superintendent E. D. Wright has been appointed Superintendent, and assigned to the Racine & Southwestern Division, with office at Racine, Wis.

Cleveland & Mahoning Valley.—The following officers were elected at the annual meeting in Cleveland, O., Aug. 1: Stevenson Burke, President; E. R. Perkins, Treasurer; and E. E. Poppleton, Secretary.

East & West Alabama.—The following directors and officers were elected at a meeting in New York, July 27: Directors, Charles M. Fry, Frederick A. Potts, Eugene Kelly, William H. Farrell, Stephen F. Austin, R. N. Hazard, John Byrne, A. Prentice and Judge John W. Inzer, of Alabama. C. M. Fry was elected Vice-President, William H. Farrell Treasurer and Stephen F. Austin Secretary.

Grand Trunk.—The authority of the officers of the road has been extended over the Toledo, Saginaw & Muskegon, which recently passed under the control of the Grand Trunk.

Greenville & Big Stone Gap.—The incorporators of this Tennessee company are: A. S. Johnson, John B. White, J. K. P. Hall, J. B. Walker, Bird M. Robinson, W. H. Piper, J. C. Park, L. D. B. Harmon, O. T. French, A. N. Shoun and James H. Robinson.

Gulf, Colorado & Santa Fe.—The office of General Superintendent has been established and J. H. Scott has been appointed to the position, with headquarters at Galveston, Tex. He will have charge of the train, station, maintenance of way and mechanical departments.

Huntington & Guyandotte River.—The following officers have been elected: President, J. L. Caldwell; Secretary and Treasurer, Edward Isley; Chief Engineer, J. A. Fickinger, Huntington, W. Va.; Construction Engineer, George McKendree, Barboursville, W. Va.

Kirkland Land & Improvement Co.—The directors are as follows: Peter Kirk, Walter W. Williams, Leigh S. J. Hunt, Arthur A. Denney and George H. Heilbron. The principal place of business is at Seattle, W. T.

Lake Superior & South Western.—At the annual meeting in Austin, Minn., July 20, officers and directors elected as follows: President, Andrew Knox, Austin; Vice-President, W. W. Mayo, Rochester; Secretary, C. D. Belden, Austin; Treasurer, E. Damon, Directors: Andrew Nelson, B. B. Herbert, Tams Bixby, B. F. Bacon, L. S. Butler, B. H. Beckel and S. M. Smith.

Louisville & Nashville.—Andrew Beckart, Division Master Mechanic at Pensacola, has been appointed Master Mechanic of the South & North Alabama Division, with headquarters in Birmingham, Ala., to succeed C. F. Giles, transferred to the Pensacola division.

Louisville Southern.—John C. Hooe has been appointed Traveling Freight and Passenger Agent and Traveling Auditor.

O. A. Quigley has been appointed Chief Train Dispatcher.

Michigan Central.—The office of General Freight Agent A. Mackay has been removed from Detroit to Chicago.

Mobile, Jackson & Kansas City.—The following officers have been chosen: N. S. Carter, of Jackson, Miss., President; H. Austill, Mobile, Vice-President and General Manager; O. T. Compton, Adam Glass, W. H. McIntosh, of Mobile; P. W. Peoples, of Jackson, and C. W. Robinson, of Meridian, Executive Committee.

New York & Northern.—R. S. Hayes has been elected President, to succeed H. F. Dimock, resigned.

Pennsylvania Co.—C. E. Targe has been appointed Superintendent of Bridges of the Erie & Ashtabula division. T. King has been appointed Supervisor of the Erie & Pittsburgh, to succeed C. E. Targe. The headquarters for both will be at Jamestown, Pa.

Rutland.—The annual meeting was held in Rutland, Vt., July 26. The directors elected are as follows: John W. Stewart, William Wills, Percival W. Clement, George H. Ball, Le Grand B. Cannon, Frederick Billings, James Roosevelt, H. G. Young and Benjamin H. Bristow.

Stockton & Lodi.—The following directors of this California company have been elected: H. J. Corcoran, J. D. McDougall, H. M. Fanning, George A. Atherton and R. R. Smith.

Waynesborough, Pascagoula & Gulf Coast.—The following officers were elected at a meeting of the incorporators at Scranton, Miss., J. R. S. Pitts, President; M. M. Evans, Vice-President, and P. K. Meyers, Secretary.

OLD AND NEW ROADS.

Aberdeen, Bismarck & Sioux Falls.—The preliminary survey has been completed from Aberdeen, to Sioux Falls, Dak., and an effort is being made to induce the Illinois Central to build the road. If this fails, it is not very probable that anything further will be done, as the local company has no funds.

Cape Fear & Yadkin Valley.—Grading is being rapidly pushed on the Madison Branch from Stokesdale to Madison, N. C., and it is expected to begin tracklaying this month.

Chattanooga, Hiawasse & Augusta.—Negotiations are being made with a construction company to complete the road from Chattanooga to Murphy, N. C., 94 miles. Henry A. Colton, Murphy, N. C., is president.

Chicago, Hannibal & Springfield.—The engineer's headquarters have been removed from Mexico, Mo., to Chicago, Ill., and the surveys for the line in Illinois will soon be commenced.

Chicago & Indiana Coal.—About nine miles of track has now been laid on the extension from Goodland, Ind., to a connection with the Chicago & Eastern Illinois at Mokena, Ill., a distance of 31 miles.

Chicago, Santa Fe & California.—The company contemplates building large shops at the town of Lake, Ill.

Chicago, St. Louis & Paducah.—Tracklaying has been resumed at the crossing of the Cairo, Vincennes & Chicago, at Parker, Ill., and is to be completed to Brooklyn, opposite Paducah, a distance of 39 miles, by Oct. 15.

Chicago, St. Paul & Kansas City.—The company has announced the opening of the road to St. Joseph, Mo., for general traffic.

Cincinnati, Hamilton & Dayton.—Tracklaying on the branch from McComb to Findlay, O., was completed July 25, and a train was run over the road the same day. The distance is a little over eight miles.

Covington & Macon.—The road has now been completed north from Macon to Fannington, Ga., within 13 miles of Athens.

Farmville & Powhatan.—The grading has now been completed from Jennings Crossings toward Farmville, Va., for 40 miles, but tracklaying will not be commenced until the grading has been finished to Farmville, 64 miles from Jennings Crossing, and the western terminus of the road.

Great Western Air Line.—The surveyors have received orders to return to Charlotte, N. C., to await further directions. They had finished the preliminary survey to a point in Randolph County about 63 miles from Charlotte.

Greenville & Big Stone Gap.—The charter of this company has been filed at Nashville, Tenn. The object of the incorporators is to construct a line of road from Greenville, in Greene County, Tenn., to Big Stone Gap, in Virginia.

Hickman & Tiptonville.—Engineers last week made a re-survey of this old western Kentucky road, with a view to building at once. They represented the Georgia, Alabama & Tennessee Co.

Huntington & Guyandotte River.—The maps and estimates are now being made of that part of the road from Huntington, on the Ohio River, to Logan C. H., W. Va., and it is thought that grading on this part of the road will begin in the fall. The survey is to be continued to beyond Pineville, Wyoming Co., W. Va., to open up the large coking coal fields of the Flat Top Mountains. The coal in this region is considered one of the finest coking coals in the country. Valuable timber lands along the Guyandotte River will also be traversed by the road. The financial arrangements for building are said to be about completed.

Indiana & Lake Michigan.—The contract is reported let for the grading of the road from South Bend, Ind., to St. Joseph, Mich., a distance of 40 miles. The heaviest grade is 40 ft. to the mile, and the cost is estimated at about \$14,000 per mile.

Jacksonville, Tampa & Key West.—It was reported this week that a consolidation would soon be effected between this road and the Florida Southern. The former road extends from Jacksonville to Sanford, Fla., 125 miles, with 107 miles of branches; the Florida Southern extends from Palatka to Punta Gorda, 237 miles, with several branches. The roads connect at Palatka and Sanford, Fla.

Kansas City, El Paso & Mexican.—The preliminary survey has now been completed from El Paso, Tex., northwest to White Oaks, N. M., a distance of about 160 miles.

Kansas City, Fort Scott & Memphis.—At a meeting, in Boston, July 30, the directors declared a semi-annual dividend of 4 per cent. on the preferred stock and 1 per cent. on the common stock of \$10,000,000. This road is a recent consolidation of the Kansas City, Fort Scott & Gulf, and the Kansas City, Springfield & Memphis, and last February 2½ per cent. was paid on the common stock of each. At the time of the consolidation an official circular stated that dividends of 5 per cent. per annum could be paid on the common stock. Gross earnings in the first half of this year were \$2,000,000, a comparative loss of \$275,000. The Southwestern rate war and bad crops have caused the loss.

Kansas City & Sabine Pass.—The company is recording in different counties in Missouri a first mortgage for \$3,000,000, made in favor of the Holland Trust Co. of New York.

Kentucky Midland.—The meeting held in Paris, Ky., to vote on the proposition for the city to subscribe \$50,000 to the road resulted in a vote of 287 to 87 in favor of the subscription.

Kentucky Union.—It is rumored that the company has made arrangements for using the tracks of the Newport News & Mississippi Valley road from Hedges to Lexington, Ky., instead of building the proposed extension north through Winchester to Lexington.

Lehigh & Hudson River.—It is announced that the Central of New Jersey now holds a controlling interest in the road through the ownership of two-thirds of the capital stock.

Louisville Southern.—The surveys have just been finished for the extension of this road from Lawrenceburg to Lexington, Ky., a distance of 20 miles, and construction must begin on or before Oct. 1, according to the propositions on which subsidies were voted.

Regular daily train service was established between Louisville and Lexington via Burgin on July 29. A telegraph line has now been completed from Louisville to Burgin.

Mary Lee Coal & Railway Co.—Incorporated in Alabama to build railroads, mine coal, iron ore, etc., and build and operate rolling mills and furnaces. The capital stock is \$500,000, and the principal office is to be in Birmingham. Col. J. A. Montgomery is interested.

Marietta, Columbus & Northern.—The company has sued William R. Utley and George Potts on account of a contract which the company entered into with them, Oct. 14, 1887, to build the branch to Stewart, O., for \$62,000. Mr. Utley has been the financial agent of the company in New York, and the company charges that the contract was fraudulently made by him and its former president, W. P. Cutler, to its great injury. Feb. 10, 1888, the company paid to Mr. Utley 10 of its \$1,000 mortgage bonds as partial compensation of the work done under the contract. In Supreme Court, Chambers, in New York, Judge O'Brien this week refused to grant an injunction to restrain Mr. Utley and Mr. Potts from disposing of the bonds pending litigation. In the suit the company asks that the contract be abrogated and that the bonds be returned. Judge O'Brien says that there is nothing to show that Mr. Utley and Mr. Potts have not done work enough to earn the bonds.

Maysville & Big Sandy.—Tracklaying from Maysville to Newport, Ky., has now been completed through Dover to Augusta, Ky., about 15 miles from Maysville.

Mexican National.—Theodore D. Kline has been appointed General Superintendent of the Northern Division, to succeed C. A. Merriam, resigned.

Minneapolis, St. Paul & Sault Ste. Marie.—A preliminary survey is being made from a point five miles west of Gladstone, Mich., to the Marquette Iron Range, a distance of 60 miles.

Missouri, Kansas & Texas.—The company defaulted Aug. 1 on the interest due on the consolidated first mortgage 7 per cent. bonds.

Mount Pleasant & Seaview City.—It is announced that the company organized to build the road has completed all financial arrangements, and will have the road finished by next spring. It is to be built from Mount Pleasant, S. C., to Sullivan's Island. Ferry boats are to be run between Charleston and Mount Pleasant. The charter was granted about 14 years ago, but all attempts to build the line have heretofore been unsuccessful. Maj. R. C. Gilchrist, Charleston, is president.

Newport News & Mississippi Valley.—It is stated that within the next six or eight months the company will be running into Louisville, Ky., over the Louisville Southern via Lexington. The road now being built from Lawrenceburg to Lexington will shorten the distance from Lexington to Louisville something over 20 miles, and it is said that running arrangements have already been perfected.

New York, Mahoning & Western.—Judge Lemmon issued an order at Toledo, O., last week, authorizing the execution of the mortgage on the road, and the issuing of \$400,000 in bonds. The proceeds are to be used in paying the debts of the Mahoning Construction Co. The Mercantile Trust Co. has been appointed trustee of the bonds.

New York, New Haven & Hartford.—A survey is being made between Bridgeport and South Norwalk, Conn., on the New York Division for two additional tracks, which it is expected will be laid next year. About seven miles of third and fourth track has been laid between Mamaroneck and Port Chester, N. Y. Some of this will, however, have to be changed when the grading is completed for the old tracks. The contractors for this work are J. W. Daly, of Rye, N. Y., and J. Dwight, of New York City.

Northern Pacific.—It is stated that the negotiations of the Manitoba government with the officers have resulted in completing an arrangement by which the Northern Pacific interest will purchase the Red River Valley road and build about 300 miles of branch lines in the province. It is understood that the government proposes to guarantee the bonds of the company to the extent of \$6,500 a mile, at five per cent. for 20 years.

The Northern Pacific has agreed to establish an immigration bureau at Winnipeg, and keep an agent at Castle Garden to see that Manitoba gets a fair share of all immigrants landing there. The Legislature will be summoned Aug. 26, to pass special legislation in connection with the deal.

Olympia, Black River & Chehalis Valley.—Representatives of the company have gone to Portland to purchase rails and complete other arrangements for building the first ten miles of the road.

Oregon Railway & Navigation Co.—Brayton Ives and other stockholders have begun a suit in the Supreme Court in New York to enjoin the officers and directors of the company from constructing a bridge across the Snake River at Raparia, W. T., and proposed branches from Endicott, W. T., to the Cœur d'Alene Mountains and from Farrington to Rockford.

Mr. Ives and his associates maintain that the projected lines are in violation of the lease of the company made in April, 1887, to the Oregon Short Line Co. and the Union Pacific. Justice Van Brunt has granted a temporary injunction restraining the company from doing any work pending the application to continue the injunction, which was argued this week.

Philadelphia & Reading.—Surveyors have begun work on the new elevated line in Philadelphia from the Twelfth and Market streets terminus, and President Corbin has declared that he will not wait for the permission of Councils, but will go ahead and construct his road on the property owned by the company. The road cannot be extended across the streets, but can be built to each street crossing, so that when Councils permit the right of way to the company, the bridges can speedily be erected.

Portland & Ogdensburg.—The City Council of Portland, Me., this week unanimously confirmed the lease of the road to the Maine Central for 999 years.

Portland & Willamette Valley.—The controversy over part of the right of way in Portland has been adjusted, and it is now expected that connection will be made with the depot in that city in about two weeks.

St. Louis, Hannibal & Omaha.—Meetings are being held at places along the proposed road to obtain funds to pay for the survey of the line. S. M. Pickler is President of the road.

St. Louis & San Francisco.—The Secretary of the Interior has called upon the company to show cause within 30 days why proceedings should not be taken to secure the restoration of 90,827 acres of land alleged to have been erroneously patented to the Atlantic & Pacific Co. The land is in the state of Missouri, between Springfield and the Indian Territory border.

Savannah, Dublin & Western Short Line.—John H. Powers, of Macon, Ga., has applied for a Receiver, claiming that the road is insolvent and cannot pay him the judgments which he has against it for contract work. The application has been granted, and Col. R. J. Davant has been appointed Receiver.

South Pennsylvania & Ohio.—It is stated that a meeting of the stockholders of this road, which is building from Sherrodsville to Martin's Ferry, O., will be held in the latter place, on Aug. 28, to consider and vote upon the question of the change of terminus from a point at or near the line between Sandy and Fairfield townships, in Tascaraus County, O., to Canton, O., and change the line to conform to the proposed change of the terminus. The question of increasing the capital stock to an amount not exceeding \$3,000,000 is also to be considered. H. A. Blood, of Cleveland, who is President of the Cleveland & Canton, is reported to be President of this road.

Stockton & Lodi.—The company has been organized with a capital stock of \$250,000 to build a road from Stockton to Lodi, Cal.

Tennessee Midland.—The surveyors are now running lines for an entrance into Nashville, Tenn. It has been decided to place under contract an extension of 50 miles from Jackson toward the Tennessee River.

The Kirkland Land & Improvement Co.—The company has been incorporated in Washington Territory. Among its numerous objects are the building and operating of railroad lines in the territory. The capital stock is placed at \$1,500,000.

Upper Coos.—It is stated that a preliminary survey will soon be made for a branch to extend from West Stewartstown, N. H., up the Connecticut River Valley to First Connecticut Lake, a distance of about 17 miles.

Wabash.—Judge Jackson, in the United States Circuit Court, at Grand Rapids, Mich., has granted orders allowing interventions on the part of the bondholders not assenting to the Purchasing Committee's terms of reorganization in the names of a committee of New York bondholders, and of Edwin Parsons of New York, a holder of the funded debt bonds, also of M. Herschel, a holder of the funded debt scrip in the foreclosure suit of the Farmers' Loan and Trust Co. of the mortgage of the Toledo & Illinois Railroad of 1853, with leave to intervene, to file cross bills, plead, answer, or demur before the first Monday in September next.

Waynesborough, Pascagoula & Gulf Coast.—The company has been organized to build a road from Waynesboro, Miss., on the Mobile and Ohio, to a point on the Gulf of Mexico, probably at Moss Point at the mouth of the Pascagoula River. The distance is about 90 miles.

TRAFFIC AND EARNINGS.

The Inter-state Commerce Commission.

At the Dubuque session the Inter-state Commerce Commission considered, besides the complaints against the Chicago, St. Paul & Kansas City for violation of the long and short haul clause, the case of Logan against the Chicago & Northwestern, Griffith against the Burlington & Missouri River and Slater against the Northern Pacific. On July 27 the Commission went to Chicago, where sessions will be held.

The Commission has rendered a decision in the cases of Frank L. Hurlburt against the Lake Shore & Michigan Southern and against the Pennsylvania Railroad Co.

The complaints were as to the classification of hub blocks for wagon wheels. These, as they are shipped, are about 12 in. long, from 4 to 12 in. in diameter, the bark turned off, a hole bored through the middle lengthwise, and the ends dipped in oil to prevent checking. The complainant averred that he established his business at Ashtabula on the supposition that hub blocks would be billed as sixth class, but that he had been obliged to pay rates on fifth class. The question was as to whether hub blocks in this state of preparation should be classified as lumber or as "wagon material unfinished." The decision by Judge Cooley is that they should be classified as lumber and in the sixth class. It is considered that these blocks are in a state analogous to that of sawed lumber; that while they are adapted for use in making wagons, the special manufacture of them into wagon material has not begun. They are unseasoned raw material on its way to the hands of the manufacturer. It was shown that the value of a carload of these blocks weighing 28,000 lbs. would be about \$280, while the value of a like load of hubs in the rough would be about \$5,000.

Order will be issued that the complaint is sustained, and in similar consignments the railroad company must conform to this construction of the classification sheet.

Incidentally the question was raised as to who were properly parties in the defense of this case. The defense raised the objection that some of the necessary parties were wanting, inasmuch as the consignments were billed for delivery by the defendant to another carrier. Concerning this Commissioner Cooley decides as follows:

In *Allen v. the Louisville, New Albany & Chicago R. R. Co.*, it was decided that when the object of a complaint was to compel a reduction of rates from a western point to the seaboard, all the carriers forming the line over which the property is transported must be parties, and that it is not sufficient to proceed against the initial carrier alone. The reason is obvious; all the carriers are interested alike and directly, and any order made against the initial carrier alone would be altogether futile, since the direction to that carrier to change the rate for the whole distance would be one it would have no power to comply with. But an order to this defendant that it receive merchandise and bill it in a particular class for transportation would be one that there would be no difficulty in its complying with without awaiting the consent of others.

It is true that the other carriers which have received complainant's property from the defendant are interested in the question the case presents; but so are all the parties which united in making official classification No. 2, and which are governing their rates by it. If in this case it should be held that the classification actually made by the defendant was erroneous, all the carriers making rates under official classification

fication No. 2 will be expected to conform to the ruling. The interest is so apparent that if any of such carriers had appeared and asked to be heard when this case was presented the request would have been granted without hesitation. Nevertheless, the interest of such other carriers is indirect, and is in the question involved, rather than in the particular controversy; it is such an interest as in judicial proceedings would not make any one of them a necessary party to a suit. The defendant is not, therefore, entitled to have the case dismissed.

In Chicago, July 31, the Commission heard the complaint of the Detroit Board of Trade and the Merchants and Manufacturers' Association against the New York Central, Grand Trunk and West Shore roads. Complainants allege that for a long time the merchants and business men of Detroit have suffered by unjust and illegal discrimination in favor of Chicago at the hands of the roads named. Rates between the Atlantic seaboard and Detroit are 78 per cent. of the rates to Chicago; the distance is only about 70 per cent., and it is claimed that rates should be reduced accordingly.

Traffic Notes.

The New York, Lake Erie & Western has withdrawn its notice declining to participate in the Weighing and Inspection Bureau.

The Chicago, Milwaukee & St. Paul has reduced its through freight rates between Chicago and St. Paul to the basis of 40 cents first class. This is the same action that was taken by the Chicago, St. Paul & Kansas City, and leaves only the Northwestern and Rock Island lines still charging the regular rate of 60 cents.

The roads composing the overland route from New York to San Francisco are making special efforts to get a share of the through freight traffic, of which about three-fourths has, for several years past, gone by boat to New Orleans and thence over the Southern Pacific. The overland line take freight in special fast trains, which, in many cases, run faster than passenger trains. It is said that the Star Union Line is sending cars through from New York to San Francisco without breaking bulk.

Freight rates New York to Missouri River points are now on a basis of \$1.16 first class all rail, and 75c. first class by the Wabash lake line, being reductions of 21 and 22 cents respectively.

Live stock rates between Missouri River points and Chicago are still unsettled. The proportion received by roads in this territory on cattle billed through from Texas is \$33.75 per car, while the regular rate from Kansas City to Chicago is \$60 per car. The Chicago, Milwaukee & St. Paul is accused of taking Kansas City shipments at \$45.

Lake rates on grain from Chicago to Buffalo are higher, being on a basis of 2½ cents per bushel for corn and 2½ cents on wheat.

The trunk lines have held a meeting, at which, however, the Delaware, Lackawanna & Western and the Grand Trunk were not represented, and voted to reduce emigrant fares to the west to a basis of \$5 New York to Chicago, a reduction of 62 per cent. It is said that this action is owing to reckless cutting by the Lackawanna. The low rate has not yet been put in effect, and it seems doubtful whether it will be.

Nearly or quite all of the roads in the Northwest have agreed to run a series of harvest excursions at half fare to principal points in Dakota, Nebraska, Kansas, Colorado, Arkansas and Texas, on Aug. 21, Sept. 11 and 25, and Oct. 9 and 23. Tickets will be limited to 30 days.

The Iowa Commission Rates.

On June 28, Judge Brewer, of the United States Circuit Court, sitting at Leavenworth, Kansas, granted an injunction restraining the Iowa Commissioners from publishing the new schedule of rates made by them. This injunction was granted on the petition of the Chicago & Northwestern, the Chicago, Milwaukee & St. Paul, and the Chicago, Burlington & Quincy. On July 26 Judge Brewer ordered a preliminary injunction, continuing the former injunction. The following is a synopsis of the decision:

The first question considered was whether a suit against the Railroad Commissioners to enjoin them from putting in force a schedule of rates was a suit against the state within the provision of the eleventh amendment, and therefore one of which the federal court could not take jurisdiction.

Judge Brewer holds that the state is not a party to this suit; that is, not the real party in interest, the one to be affected by the judgment and upon whom it will operate, the real parties being the railroad companies on the one side and the shippers on the other, and that the state has only that remote interest which springs from the general welfare of the people.

The next question was as to the delegation by a state legislature of the power to fix rates to a railroad commission, no such commission being recognized by the constitution. The Supreme Court has held that the power to fix rates is a legislative power, and it is generally true that the Legislature cannot delegate its powers to another body. Notwithstanding this Judge Brewer decided to hold that the delegation is constitutional for several reasons, the principal ones being these. An act will not be declared unconstitutional unless clearly so. There is no inherent vice in delegating such power to a commission, the vital question being with both carrier and shipper that the rates prescribed be fair and reasonable and not by what body they shall be put in force. It is a question for the final determination of the Supreme Court of the State and therefore the federal courts should not anticipate its decision. Courts of sister states have sustained similar delegations of power and therefore there is a probability that this will be sustained by the Supreme Court of Iowa.

The third principal question is whether the Legislature has unlimited power in the matter of fixing rates, either by its own action or through the agency of the Railroad Commission, and this question is answered in the negative. Judge Brewer holds that the Legislature cannot fix rates so low as not to furnish some compensation to the railroad company and supply revenues sufficient to meet, first, the cost of service; second, the fixed charges by way of interest, and third, something, however, small, in the way of dividends.

He further holds that while from the volume of the testimony offered upon this application, it is not clearly established that the schedule prepared by the defendants will fail of producing compensation, yet a preliminary injunction is appropriate until there can be a full and final inquiry in reference to the publication of notice and the going into effect of the schedule. He holds that whatever might be the case as to other railroad companies, the four companies who had corresponded with the Board have a right to insist that no publication was complete and no schedule was in force at the time the restraining order was served, hence this complainant is not too late with its application, and a preliminary injunction is ordered.

The case of the Rock Island and other roads in the Iowa state courts came up before Judge Fairall, at Iowa City, July 26, but was further postponed to Aug. 1.

Switching Rates in Minnesota.

About a year ago the State Railroad Commissioners of Minnesota prescribed a rate of \$1 per car for certain switching service at Minneapolis. The roads appealed to the United States Court and Judge Brewer has just handed down a

decision in the case. The old rate varied from 25 cents to \$2. Judge Brewer says: "It is not within the power of the states, directly or indirectly, to put in force a schedule of rates when the rates prescribed therein will not pay the cost of service. In this case the defendant took no testimony and the complainant's (railroads') testimony shows that the actual cost of the service—that is, wages of the employees, rent of engines, keeping the track in repair—exceeds per car by 14 cents the amount allowed in the schedule as compensation. In other words, it costs complainant \$1.14 to do the work, and the defendants propose to allow it to charge only \$1. Whether the order of defendants is an interference with interstate commerce or not is a question I need not decide. My brother Nelson, when the application for the preliminary injunction was made to him, was of the opinion that it was not. It is certainly a very serious question whether, when property has been put in a car with the intention of shipping it outside of the state it has not already commenced its interstate journey."

Utah Rates via New Orleans.

The Texas & Pacific has made traffic arrangements with the Cromwell Steamship Line, running between New York and New Orleans, and with the Union Pacific Railroad, by which freight is taken from the Atlantic seaboard to points in Utah, Montana, Idaho and Oregon on a through tariff. Rates at present are on a basis of 23 cents (first-class) below all-rail rates.

The Union Pacific has reduced rates from Missouri River points to Utah points by from 8 to 16 per cent.

Inspection Bureau.

The following figures, showing corrections made during six months, are published. The "average reader" would be more interested in New York, Buffalo, Pittsburgh and such points than in Neenah and Wichita.

JAN. 1 TO JULY 1, 1888.			
Chicago.....	\$91,900	Omaha.....	\$27,635
Milwaukee.....	8,539	Kansas City.....	44,571
St. Paul.....	10,854	Hannibal.....	2,561
St. Louis.....	48,701	Neenah.....	67
Des Moines.....	5,711	Wichita.....	3,802
St. Joseph.....	2,343		
Missouri Valley.....	1,481	Total.....	\$248,235

Coal.

The coal and coke tonnage of the Pennsylvania originating on lines east of Pittsburgh and Erie for the week ending July 21, and the year to that date, was as follows:

	Coal.	Coke.	Total.
Total for week ending July 21.....	231,990	73,529	305,519
Total for year 1888 to date.....	6,444,381	2,132,926	8,577,307
Total for year 1887 to date.....	5,734,425	1,760,328	7,514,753

The anthracite coal tonnage of the Belvidere division of the United Railroads of New Jersey division for the same periods was as follows:

	1888.	1887.	Inc. or Dec.
Total for week ending July 21.....	37,175	25,926	I. 11,249
Total for year to July 21.....	847,195	941,738	D. 94,543

The coal tonnages for the week ending July 28 are reported as follows:

	1888.	1887.	Inc.	P. c.
Anthracite.....	824,840	683,417	141,423	18.8
Bituminous.....	309,888	140,095	169,793	28.7

The Cumberland coal trade for the week ending July 28 amounted to 73,644 tons, and for the year to that date 1,982,519 tons.

Cotton.

The cotton movement for the week ending July 27 is reported as follows, in bales:

	1888.	1887.	Inc.	P. c.
Receipts.....	3,782	1,207	2,575	200.0
Shipments.....	7,089	2,458	4,631	200.0
Stock.....	28,163	27,937	I. 226	0.8

	1888.	1887.	Inc.	P. c.
Receipts.....	8,033	2,581	5,452	250.0
Exports.....	24,275	22,145	I. 2,130	9.0
Stock.....	193,655	192,058	I. 1,597	0.5

Railroad Earnings.

The statement of earnings and expenses of the Norfolk & Western for June and the six months to June 30 is as follows:

Month of June:	1888.	1887.	Inc.	P. c.
Passenger, mail and express.....	\$83,972	\$70,536	I. \$13,436	19
Freight.....	286,792	263,661	I. 23,131	9
Gross earnings.....	\$370,764	\$334,200	I. \$36,564	11
Expenses and taxes.....	226,201	210,928	I. 15,273	12
Net earnings.....	\$144,563	\$123,272	I. \$21,291	17
P. c. of expenses.....	63	63		

Six months—Jan. 1 to June 30:	1888.	1887.	Inc.	P. c.
Passenger, mail and express.....	\$440,181	\$325,293	I. \$114,757	35
Freight.....	1,881,794	1,554,369	I. 327,425	21
Gross earnings.....	\$2,321,975	\$1,879,662	I. \$442,313	24
Expenses and taxes.....	1,421,879	1,150,105	I. 271,774	24
Net earnings.....	\$900,096	\$729,557	I. \$170,539	24
P. c. of expenses.....	61	61		

The following is the statement of operations of the Louisville & Nashville for the year ending June 30 (June estimated) as compared with the previous year:

	1887-8.	1888-7.	Inc. or Dec.
Gross earnings.....	\$16,371,449	\$14,979,992	I. \$1,391,457
Op. expen. (62.79 p. c.).....	10,279,796	8,953,502	I. 1,326,294
Net earnings.....	\$6,091,653	\$6,026,490	I. \$65,163
Fixed charges:			
Interest and rentals.....	4,404,100	4,286,583	I. 117,517
Taxes.....	375,641	363,512	I. 12,129
Total.....	\$4,779,741	\$4,650,095	I. \$129,646
Net earnings.....	\$1,311,912	\$1,376,396	D. 64,484
Other income from investments.....	528,525	479,858	I. 48,667
Total.....	\$1,840,437	\$1,856,254	D. \$15,817
Less 5 p. c. stock dividends.....	1,518,000		
Surplus.....	\$322,437		I. \$1,518,000

The comparative statement of the earnings and expenses of the Northern Central for June and the six months to June 30 is as below:

Month of June:	1888.	1887.	Inc. or Dec.
Gross earnings.....	\$551,120	\$554,403	D. \$3,283
Oper. expenses.....	351,429	344,884	I. 6,545
Net earnings.....	\$199,691	\$209,519	D. \$9,828
Six months to June 30:	1888.	1887.	Inc. or Dec.
Gross earnings.....	\$2,900,141	\$3,081,592	D. \$181,451
Oper. expenses.....	2,001,132	1,826,757	I. 174,375
Net earnings.....	\$899,009	\$1,254,835	D. \$355,826

The following is the statement of the New York, Lake Erie & Western for June and the ten months to June 30:

Month of June:	1888.	1887.	Inc. or Dec.
Gross earnings.....	\$2,382,194	\$2,252,538	I. \$129,656
Oper. expenses.....	1,470,069	1,461,298	I. 8,771
Less due leased lines.....	\$812,125	\$788,248	I. \$23,885
Net earnings.....	\$610,984	\$802,275	I. \$191,291
Ten months—Oct. 1 to June 30:	1888.	1887.	Inc. or Dec.
Gross earnings.....	\$20,019,664	\$19,386,226	I. \$633,438
Working expenses.....	13,061,853	12,491,311	I. 570,542
Less due leased lines.....	\$6,957,811	\$6,894,915	I. \$62,896
Net earnings.....	\$5,201,561	\$5,223,515	D. \$21,954

Earnings of railroad lines for various periods are reported as follows:

Month of June:	1888.	1887.	Inc. or Dec.	P. c.
Balt. & Potomac.....	\$133,869	\$122,797	I. \$11,072	9.0
Net.....	43,002	44,293	D. 1,291	2.2
Canadian Pac.....	1,180,996	1,059,507	I. 121,489	11.4
Net.....	390,949	388,763	I. 2,186	0.5
Gen. of Georgia.....	462,814	462,540	I. 274	0.0
Net.....	109,124	96,921	I. 12,203	12.6
Central of N. J.....	1,074,180	988,157	I. 86,023	8.7
Net.....	491,379	455,635	I. 35,744	7.7
Cleve. & Canton.....	34,263	30,141	I. 4,122	13.3
Net.....	11,893	9,251	I. 2,642	22.2
Cl. C. C. & I.....	612,451	625,539	D. 13,088	2.1
Net.....	174,723	207,266	D. 32,543	15.4
Leh. & Wilkesb.....	692,806	607,617	I. 85,189	14.0
Net.....	122,031	39,217	I. 82,814	210.2
N. Y. L. E. & W.....	2,282,194	2,252,538	I. 29,656	1.3
Net.....	610,984	602,275	I. 8,709	1.3
Norfolk & West.....	370,764	334,200	I. 36,564	10.8
Net.....	134,563	123,272	I. 11,291	8.9
Northern Central.....	551,266	554,404	D. 3,138	0.5
Net.....	199,836	209,519	D. 9,683	4.3
Pennsylvania.....	5,080,400	4,911,858	I. 168,542	3.4
Net.....	1,571,539	1,561,459	I. 10,080	0.6
Petersburg.....	37,291	29,873	I. 7,418	24.1
Net.....	14,537	12,467	I. 2,070	16.6
Phila. & Read.....	1,840,985	1,775,912	I. 65,073	3.7
Net.....	946,620	977,499	D. 30,879	2.1
P. & R. C. & I.....	1,990,413	1,905,762	I. 84,651	4.4
Net.....	31,332	85,233	D. 53,901	16.8
T. & N. Y. C. & P.....	3,831,398	3,381,674	I. 449,724	13.3
Net.....	1,037,852	1,012,732	I. 25,120	2.4
Rich. & Petersb.....	23,443	20,739	I. 2,704	15.0
Net.....	8,726	8,296	I. 430	5.1
Stat. Isl. Rap. T.....	111,216	100,419	I. 10,797	10.0
Net.....	46,136	34,277	I. 11,859	32.3
W. N. Y. & Penn.....	272,591	228,170	I. 44,421	19.3
Net.....	87,681	55,167	I. 32,514	58.1
W. Va. Cent. & P.....	69,636	28,682	I. 40,954	121.4
Net.....	23,214	11,350	I. 11,864	100.0
Total (gross).....	\$16,814,562	\$15,667,505	I. \$1,147,057	7.3
Total (net).....	5,099,179	4,870,742	I. 228,437	4.1

Six months—Jan. 1 to June 30:

Balt. & Potomac.....	745,431	701,391	I.	44,040	6.2
Net.....	226,119	236,647	D.	10,528	4.2
Canadian Pac.....	5,833,391	4,728,793	I.	1,104,598	23.3
Net.....	1,113,870	941,337	I.	172,533	18.2
Central of N. J.....	5,756,047	5,281,480	I.	474,567	9.0
Net.....	2,440,760	2,297,961	I.	142,799	6.3
Cleve. & Canton.....	184,450	172,503	I.	11,947	6.4
Net.....	56,321	39,788	I.	16,533	41.0
Cl. C. C. & I.....	3,500,710	3,500,868	D.	30,158	0.8
Net.....	866,912	1,063,975	D.	197,063	18.5
Leh. & Wilkesb.....	4,633,678	3,860,503	I.	773,175	19.9
Net.....	813,285	431,480	I.	381,805	80.1
Nash. C. & St. L.....	1,490,015	1,454,280	I.	35,735	2.4
Net.....	602,213	642,023	D.	39,810	6.1
N. Y. L. E. & W.....	12,846,611	12,498,582	I.	348,029	2.8
Net.....	3,331,850	3,251,346	I.	80,504	2.4
N. Y. & N. E.....	1,284,843	1,188,606	I.	96,237	8.0
Net.....	370,181	371,778	D.	1,597	0.4
Norfolk & West.....	2,323,975	1,879,784	I.	444,191	23.6
Net.....	902,095	729,679	I.	172,416	23.6
Northern Central.....	2,900,142	3,081,593	D.	181,451	5.7
Net.....	899,019	1,254,836	D.	355,817	28.2
Oreg. R. & N. Co.....	2,777,281	2,280,949	I.	496,332	21.8
Net.....	880,124	844,802	I.	35,322	4.1
Pennsylvania.....	27,878,188	26,370,724	I.	1,507,464	5.6
Net.....	8,692,758	8,784,983	D.	92,225	1.3
Petersburg.....	2,222,580	1,844,008	I.	378,572	20.7
Net.....	87,620	87,041	I.	579	0.6
Phila. & Read.....	9,157,944	10,154,498	D.	996,554	9.8
Net.....	3,863,291	5,186,980	D.	1,323,689	28.5
R. & C. & I.....	6,659,309	7,646,046	D.	9,686,837	100.0
Net.....	2,240,420	2,282,400	I.	41,980	1.9
Total both co's.....	11,861,803	17,800,543	D.	1,983,740	11.1
Net.....	3,865,491	5,472,120	D.	1,603,629	20.4
Rich. & Petersb.....	132,225	114,434	I.	17,791	14.9
Net.....	51,275	54,330	D.	3,055	5.8
Rich. & W. P. Ter.....	2,230,663	1,980,390	I.	249,662	12.6
Net.....	1,010,924	904,373	I.	106,551	11.7
Virginia Midl.....	835,843	747,549	I.	88,294	11.8
Net.....	339,659	285,173	I.	54,486	16.0
Char., Col. & A.....	424,834	378,812	I.	46,013	12.2
Net.....	104,989	124,932	I.	22,057	15.5
Col. & Gr. Div.....	229,870	244,595	I.	19,725	9.3
Net.....	105,324	361,244	I.	98,983	18.5
W. N. Cal. Div.....	302,676	329,061	D.	26,385	7.8
Net.....	51,331	53,597	D.	2,266	3.8
Tot. R. & W. P. T.....	4,103,886	3,680,725	I.	423,161	11.7
Net.....	1,672,217	1,423,003	I.	249,214	17.5
South Carolina.....	568,703	593,156	I.	61,547	14.4
Net.....	130,478	130,478	I.	30,371	14.3
Staten Isl. R. Co.....	368,934	353,708	I.	15,226	4.1
Net.....	74,362	53,175	I.	21,187	40.0
T. C. & I. Co. Net.....	331,800	322,200	I.	9,600	2.8
W. N. Y. & Pa.....	1,368,392	1,235,542	I.	162,850	13.0
Net.....	361,281	156,931	I.	204,350	130.8
W. Va. Cent. & P.....	290,710	157,509	I.	133,201	84.7
Net.....	109,265	52,358	I.	56,957	107.7
Total (gross).....	\$95,083,975	\$91,814,841	I.	\$3,280,134	3.5
Total (net).....	28,888,095	26,300,039	I.	2,588,056	9.3